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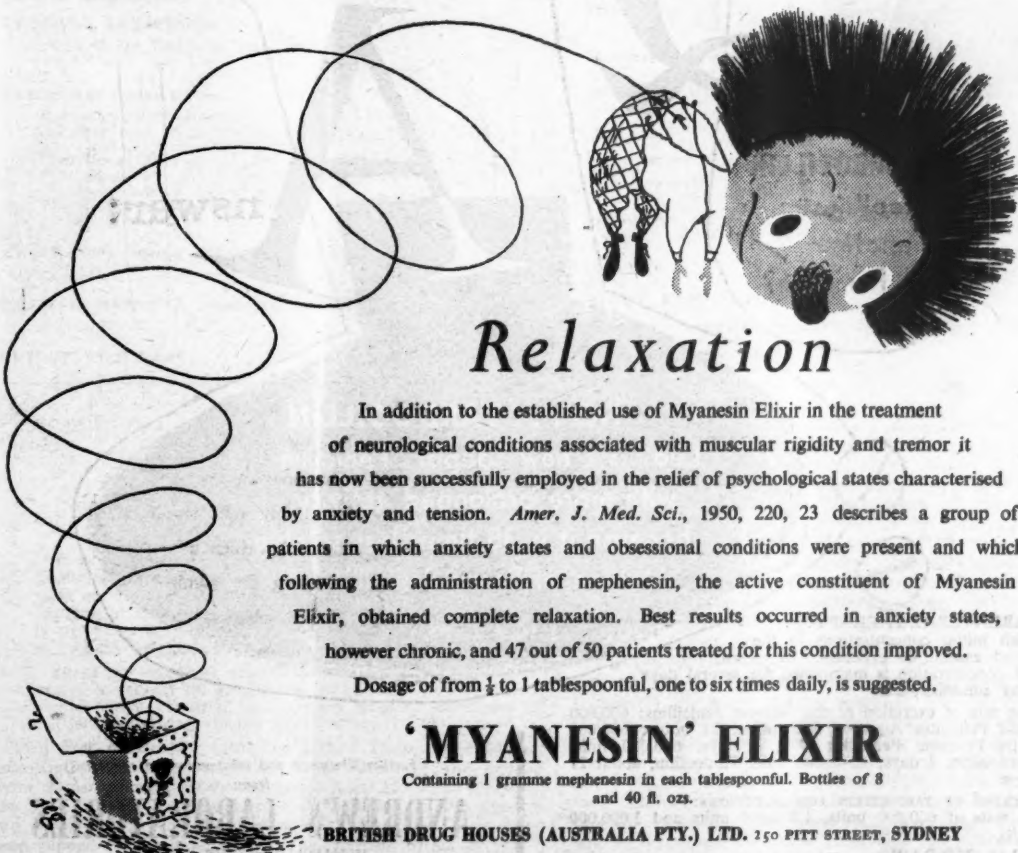
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# THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—42ND YEAR

SYDNEY, SATURDAY, MARCH 19, 1955

No. 12



## Relaxation

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### PRESENT-DAY TECHNIQUE IN ANÆSTHESIA.<sup>1</sup>

By ROBERT B. SPEIRS,  
Sydney.

It is our opinion that in deaths under anæsthesia the anæsthetist is more responsible than either the drug used or the pathological condition of the patient (always excepting the unusual emergency where the patient is pulseless and practically moribund before anæsthesia is begun)—Macintosh and Bannister (1952).

In many surgical amphitheatres attempts to employ newer methods of anæsthesia by poorly qualified personnel have resulted in an even greater incidence of death.—Anæsthesia Study Commission (1947).

THE first of these quotations comes from the foremost anæsthetic teaching centre of Great Britain; the second from an anæsthesia study commission in America. As they are both of extreme importance in relation to the subject you have chosen for discussion this afternoon, they have been placed in the most prominent position of the paper.

With the older methods of anæsthesia, a good deal of the responsibility for keeping alive remained with the patient's own vital processes; for example, a patient inhaling ether vapour from an open mask will maintain his

own circulatory and respiratory functions well beyond the stage of profound muscular relaxation; and if he is overdosed to the point of respiratory arrest, he will nevertheless seldom fail to recommence breathing if the administration is discontinued. Thus most of the anæsthetist's responsibility was discharged if he combated excessive surgical exsanguination by transfusing the patient with blood, forestalled or promptly relieved obstruction to the airway by one thing or another, and kept the assistant surgeon's elbows off the patient's chest. With present-day methods it often happens that the responsibility for keeping the patient alive rests much more entirely upon the shoulders of the anæsthetist, and the anæsthetist must be willing, and able, to assume that responsibility if he wishes to employ the more modern methods. The patient's survival is the paramount consideration, and it should take complete precedence over the patient's likes and dislikes and the reputation of the doctor for being modern and up to date. We cannot shed our responsibility because the patient may demand this or that, since a patient is in no position to make a sound judgement in this matter, and he should not be expected to know that the mortality attributable to intravenous anæsthesia is thought to be in excess of the mortality attributable to appendicitis. One of the main functions these days of the honorary anæsthetic staff of a hospital seems to be to prevent the administration of the newer anæsthetic drugs by medical officers insufficiently trained in their use. The anæsthetic death rate tends to reflect inversely their success or otherwise in this task.

<sup>1</sup>Read at a meeting of the New South Wales Branch of the British Medical Association on October 30, 1954, at Tamworth.



With these preliminary but very fundamental remarks we come to a consideration of what an anaesthetic these days is usually expected to supply, and here, drawn to your notice a first time, are the three components of hypnosis, analgesia and relaxation. That is, we usually attempt to produce unconsciousness, non-appreciation of painful stimuli, and sufficient muscular relaxation to allow surgical access. Whilst producing these conditions we have to ensure that vital tissues, particularly the brain and the heart, continue to receive an adequate supply of oxygen and continue to eliminate carbon dioxide. Like most fundamentals, this concept is simple; but a little thought will show that trouble, in an anaesthetic sense, rarely occurs unless this supply of oxygen to vital tissues or elimination of carbon dioxide from the body is interfered with. It will not greatly strain our memories of physiology to remember briefly some features which bear particularly upon an anaesthetic administration. The airway must be free and the tidal exchange must be adequate. Two examples may be given. (i) A small child submitted to undue respiratory resistance by being attached to a standard anaesthetic machine responded after a period by convulsions which gave promise of being fatal. (ii) Experimentally it has proved possible to maintain adequate oxygenation with an oxygen-rich atmosphere for forty-five minutes with no respiratory movements at all and no insufflation into the lungs; but the alveolar carbon dioxide level rose from its normal 5% to about 50% and a certain not unexpected mortality followed. It is not difficult to produce a clinical parallel to the first instance by using a narrow-bore Magill angle-piece in an otherwise freely flowing circuit; an administration of cyclopropane and oxygen follows the lines of the second instance unless the patient's respiratory movements are manually assisted.

A sufficiently high partial pressure of oxygen must be maintained in the mixture of gases at the lung alveoli to ensure the transfer of adequate amounts to the bloodstream. The oxygen not only has to be supplied at a minimum rate of, say, 300 cubic centimetres per minute, but it has to be at a relative partial pressure adequate to ensure its transfer across the alveolar membrane to the blood. A mixture of 500 cubic centimetres of oxygen with 1000 cubic centimetres of nitrous oxide looks attractive—and has been shown to be an anoxic one. It fails to produce an adequate height of partial pressure.

The patient must have enough haemoglobin to carry the oxygen. Operations of magnitude on patients whose haemoglobin levels are unknown invite trouble.

The blood volume is usually assumed to be adequate, and we do not worry much about it until something unpleasant happens. Change in posture of a patient in whom the blood volume has been reduced, say by a period of operating, often induces collapse. You may have seen this happen when a patient submitted to a laminectomy in the prone position is turned over on to his face for transport back to bed. Moreover, it was a very well recognized cause of immediate death when it was the practice to perform abdomino-perineal resection of the rectum by a technique involving turning the patient over half-way through the operation. Many a flickering soul has been preserved on this earth by its body not being taken back to bed immediately the operation was concluded.

Our ideas on how high the blood pressure needs to be have been disturbed lately by the hypotensive techniques of which we shall make mention later. For short-term projects such as surgical operations it would appear that we can disregard the head of pressure necessary to procure kidney filtration and concern ourselves with the oxygenation of the heart and brain. Provided that the blood is kept oxygenated and flowing through these parts, it would seem that these vital organs will retain their function at levels of blood pressure which are unable to be recorded clinically. It is my belief that the patient in *extremis* who dies when a reasonably chosen dose of thiopentone and/or a relaxing agent is injected into him, is slain not by the drug, but by the anoxia which follows its further depression of the respiration. To put it in practical terms, immediate and continuous forcible inter-

mittent inflation with oxygen from an anaesthetic machine will enable a desperate anaesthetic to be undertaken; but if this inflation is delayed so that even one breath is forgone by the patient, it may be the end.

This may be an appropriate point to make a further affirmation of faith. Few will accuse me of offering great encouragement to the members of the Northern District Medical Association to make free use of modern technique in anaesthesia. But I would state my belief that an anaesthetic machine is God's own gift in anaesthetic emergencies of all kinds, whatever agent may be in use, and whether or no the machine had any part in the anaesthetic up to that point. More of this later. It should also be said that comments such as have been made on the capacity of the body to function in the presence of a low level of blood pressure must not be construed to imply that the blood pressure no longer needs to be kept under close observation. It remains a most invaluable indicator of disturbances of physiology which it is the duty of the anaesthetist to correct—or else! It will be well known to you that surgery tends to yield poor results in the subjects of physical trauma whose blood pressures are found to be down below say 100 millimetres of mercury, systolic, unless these blood pressures are first restored by transfusion. The blood pressure is a valuable index of the degree to which the body has succumbed to trauma, or been resuscitated. A rise in the patient's blood pressure may be the first indication to you that your colleague has omitted to enter up the six hour's use which he had yesterday from the soda lime canister of the hospital's anaesthetic machine. The complexity of a modern anaesthetic tends greatly to increase the risks to which the patient is subjected, and a modern Dante (Geoffrey Kaye, of Melbourne) has thus pictured the type of pit suggested above, into which the unwary may be drawn through putting their trust in false gods:

Here rests, beneath this grassy plot,  
My patient, Mrs. Geer,  
Who, being curarized, could not  
Exhibit hyperpnoea.  
If we could meet a second time,  
Less confident I'd be  
In "indicator" soda lime:  
I'd measure her B.P.!

Now to come back, for the second time, to the triad of hypnosis, analgesia and relaxation. The older anaesthetic agents, such as ether and chloroform, produce all these three components in satisfactory measure, at the same time leaving sufficiently intact such a vital function as the patient's respiration. It should be appreciated that such an agent as thiopentone given intravenously produces excellent hypnosis, relaxation which tends to be short-lived, and analgesia of such poor degree that the patient may respond to a skin incision by violent movement at a time when his respiration is completely paralysed.

It is also noteworthy that relaxing agents, such as curare, are generally held to be devoid of hypnotic and analgesic power, and liberal use of such relaxing agents, coupled with inadequate use of other agents, has resulted many times in a patient awakening during the course of an operation, feeling the surgical stimuli, and being quite unable to indicate his appalling predicament because he is paralysed and cannot move a muscle.

Relaxing agents are probably the most interesting innovation of recent years. Notwithstanding claims to the contrary in the literature which accompanies the ampoules, the paralyzing effect includes the muscles of respiration, and if any serious degree of abdominal relaxation is produced it is necessary for the anaesthetist to take over the patient's respiratory activity and intermittently compress and release the bag of an anaesthetic apparatus to which he has previously attached the patient. There is some evidence that this active ventilation may prolong and/or potentiate the relaxant or hypnotic effect of drugs present in the patient. In general, it will be found that unless a reasonable element of an analgesic is supplied, painful stimuli will break through moderate dosage of any relaxant and surgical access will become difficult. Should further doses of relaxant be exhibited to overcome this difficulty,



it may be found impossible to bring back the patient's respiration at the conclusion of the operation, and the anaesthetist may be obliged to spend several or many hours artificially ventilating his victim. Undue prolongation of such a phase as this is often accompanied by an alarming deterioration of the patient's general condition. A related phenomenon, in which the patient may be seen to deteriorate much more rapidly and spectacularly, occurs at the conclusion of an operation, when the peripheral stimuli of stitching the skin, rolling the patient to one side and the other for the application of dressings, lifting him on to the trolley and off it into the bed, all provide sufficient stimulus to break through the paralyzing effect of a dose of relaxant still present in the patient. That is, his respiration will appear to be, and will in fact be, adequate at this time, but with the cessation of these stimuli respiratory paralysis will come on once again, at a stage when he may well be back in bed, alone and unobserved.

The pharmacology of the action of relaxants is believed to be as follows. Normal neuro-muscular transmission involves acetylcholine and cholinesterase. Acetylcholine is released at the nerve endings in response to a nerve impulse. This acetylcholine depolarizes the motor end-plate situated on the muscle fibre, which causes a wave of contraction to affect the muscle fibre. The acetylcholine, having fired off the motor end-plate, is forthwith destroyed by cholinesterase, so that the muscle fibre does not contract again unless a further stimulus down the nerve has released a further quantity of acetylcholine. Two of the relaxants with which we are commonly concerned, tubocurarine and gallamine, exert their paralyzing effect by preventing the effect of the acetylcholine upon the motor end-plate. Neostigmin, which is used as an antidote to these two relaxing agents, exerts its effect by inhibiting the action of the cholinesterase, thus enabling the acetylcholine to persist and overcome the blocking effect of the relaxant. The action of two other relaxing agents in common use, decamethonium and succinylcholine, is to produce an excess acetylcholine-like effect, so that the depolarization spreads from the motor end-plate on to the adjacent muscle fibre and renders it inexcitable; it will be apparent that neostigmin will not antagonize these latter effects, but will potentiate them, and it will also be apparent that any attempt to employ mixtures of relaxing agents may lead to entirely unpredictable effects.

Quite small doses of either very greatly potentiate the action of all these relaxing agents; and extreme care should be exercised to control the dosage of all these agents. Although it is described as an antidote, neostigmin has side effects of its own which prevent its being given in dosage greater than five milligrammes, and even the more usual dose of 2.5 milligrammes should be given in association with atropine. If more than a mild excess of tubocurarine or gallamine is present, when its effect is to be reversed the practicable dose of neostigmin will prove to be inadequate.

Decamethonium in low dosage, up to five or seven milligrammes, is one of the most predictable and reliable agents in current use; in dosages above this level its effects are entirely unpredictable, and pentamethonium, once marketed as an antidote to it, should never on any account be employed for this purpose. That leaves only succinylcholine of the four common relaxants, and from time to time a patient is encountered who goes into very prolonged apnoea from a very small dose of succinylcholine. One has also heard of instances in which the effect of this agent apparently completely passed off in the operating theatre, but returned the patient to an apnoeic state back in the ward—a very frightening and unpleasant occurrence.

If we take average dosage with average patients and average quantities of supplementary anaesthetic agents, the effect of 15 milligrammes of tubocurarine is fully developed in about four minutes and lasts about forty minutes. The effect of 100 milligrammes of gallamine comes on rather more quickly and lasts some thirty minutes; the effect of three milligrammes of decamethonium takes some three to four minutes to develop and lasts some fifteen minutes; the effect of 50 milligrammes

of succinylcholine comes on within fifteen seconds and lasts some two to three minutes. The degree of paralysis reached would easily be greatest in the case of succinylcholine, and probably least in the case of tubocurarine. Small supplementary doses, insufficient of themselves to cause paralysis, will reveal that considerable residual effect of these relaxants persists after the mentioned intervals of time, although these residual effects may not be clinically apparent.

Adequate ventilation of a paralysed patient cannot be achieved except by active inflation of the lungs, so that it is quite indefensible to attempt the employment of these methods without inflating apparatus and oxygen at hand, and without full knowledge on the part of the anaesthetist of how to employ them with effect.

One may say that anyone who administers an anaesthetic of any kind should be capable of employing an anaesthetic machine for purposes of resuscitation. By far the most effective measure which can be undertaken with a patient who suddenly collapses under any form of anaesthesia is immediate intermittent inflation of his lungs with oxygen under pressure. That is, one turns on the oxygen on a machine, closes the expiratory valve if it happens to be open, and applies the face mask to the patient's face, holding the top of the mask against the patient's nose with the thumb of the left hand and the bottom of the mask against the mouth with the first finger, while the remainder of the hand presses the patient's lower jaw up into the mask. The action is one of holding the patient's face hard up into the mask; the usual untrained application, by pressing the mask against the patient's face, forces the jaw back and obstructs the airway (Figure 1).



FIGURE 1.

One forces oxygen from the machine into the patient by squeezing the bag of the machine between the right hand and the right leg, or alternatively, manipulating the lever of the machine with the right hand if it happens to have a Coxeter-Mushin type of fitting to the bag. This elementary manoeuvre is mentioned without any apology, because it is less than two years since I gave an anaesthetic machine of my own to remain permanently in the operating theatre of a small private hospital; in that time there have been five occasions when it has been left to the nursing staff of the hospital to bring this machine into action upon a collapsed patient in the manner described, the administrator of the anaesthetic having no ideas about it.

Concerning thiopentone, with which many of you are probably familiar, there has been a very considerable decrease in the scale of dosage of this agent from the time when it was first introduced. The respiratory depression produced by it was always fairly obvious, but we have come to realize that the cardiac depression produced

through it is also very considerable, and many anaesthetists make no use of it beyond employing an induction dosage of one-quarter, one-third or one-half gramme. Some employ it further to maintain hypnosis of a patient and some slight analgesia when others would prefer to obtain these effects with continued administration of a nitrous oxide and oxygen mixture. It has not ceased to produce gangrene of the forearm fairly often if injected by error into the brachial artery, or a cellulitis from extravascular injection which sometimes destroys the function of the median nerve.

Cyclopropane is a powerful hypnotic and analgesic; its initial popularity has not been sustained. Its explosive properties have always been realized to be extreme; it has also been known that any attempt to "push" the drug results in cardiac irregularities. It is some time now since Dripps described the condition of "cyclopropane shock"; but more recently it has been shown that the respiration is depressed right from the commencement of a cyclopropane administration, and it is probable that unless manual assistance to the respiration is given throughout, carbon dioxide will be accumulated in the patient.

The analgesic element tends to be deficient in many modern anaesthetic administrations, and an attempt has been made by some to overcome this by giving doses of pethidine intravenously. Sudden cardio-vascular collapse has been described as following intravenous injection of this drug; this would be extremely rare, but apnoea on the part of the patient for five or ten minutes or more is common, and a machine or its equivalent is an essential accompaniment to this technique. Pethidine reduces the chance of spasm and vagal reflexes in general if given intravenously immediately before the injection of thiopentone. It also appears to "damp down" the severity of vagal reflexes resulting from instrumentation of the larynx, and these are its greatest fields of usefulness. It may well increase the incidence of post-operative respiratory trouble by its depressant effect upon the breathing.

Trichlorethylene a few years ago seemed as though it would supply at last the analgesic element that we so sadly lack the moment we abandon ether. It is extremely useful for obstetrics, as a supplement to nitrous oxide in the dentist's surgery, for neuro-surgery, and for operations such as orthopaedic procedures upon the extremities in which relaxation may not be required. Trichlorethylene may not be used in a closed circuit with soda lime absorption, and this greatly limits its usefulness in this country, where this closed type of anaesthetic is a popular one. In Great Britain they make more use of semi-closed circuits without absorption and with higher rates of flow of nitrous oxide, for which they pay considerably less than we do, and trichlorethylene has more application to those conditions.

Time seems to allow no more than the foregoing thumbnail sketches of a number of agents in common use amongst anaesthetists. The practices of hypotension and of artificial hibernation are not at present in common use, but are full of interest. The deliberate production of hypotension for the reduction or abolition of bleeding at the operation site may be brought about by means of a spinal anaesthetic cutting off all the sympathetic outflow—that is, extending as high as the first thoracic segment—or by blocking this outflow at the autonomic ganglia by such agents as methonium compounds. In both instances posture is important, the operation site being placed high and the blood tending to pool in the dependent portions of the patient's body. Australian and American anaesthetists have tended to view the technique of hypotension with great suspicion, and in Great Britain opinion appears to be divided sharply as to its virtues or otherwise. Provided oxygen is freely available and reinforced by artificial ventilation if necessary, the patient's blood remains a good colour, the skin dry, the pulse slow, and the over-all appearance of the patient quite reasonable, notwithstanding that the blood pressure may be unrecordably low. Any blood lost while these techniques are being employed must be replaced forthwith, the condition of the patient undergoing most startling deterioration if this is not done. Provided the brain is one of the dependent parts, I have

found these techniques to be not as hair-raising as they sound; but the idea of employing them with the head high does not appeal to me at all. There appear to be a few surgical conditions in which operation is possible only by the employment of such a technique with the head uppermost, and in these instances, one presumes, the risk of sequelae simply has to be accepted if the lesion is sufficiently serious to warrant the risk being taken.

The so-called "artificial hibernation" is newer and we know less about it. Its feature is a depression of the basal metabolic rate and the bodily processes generally by such a drug as chlorpromazine, sometimes aided by artificial cooling of the patient. Reduced to this state, he withstands trauma much more successfully than when his metabolism is at a normal level. There seems to be some parallel in the ability of the cold-blooded lizard to withstand the loss of its hinder end.

#### Cardiac Arrest.

A much more practical matter which has received a lot of attention lately is the procedure to be adopted when a case of cardiac arrest occurs. It should occur very seldom in the practice of a competent anaesthetist; but every anaesthetist and every surgeon should know beforehand exactly what he is going to do about it if it should occur. The anaesthetist's first duty is to recognize it when it does occur, immediately, and not after a lapse of time. He gives the alarm and immediately commences and maintains artificial ventilation of the patient's lungs with oxygen. I believe that in many instances this will be sufficient and the heart will recommence beating. If early success is not attained, the surgeon commences an incision well out in the fifth intercostal space, on the left-hand side. Does it bleed? If it does not, the incision is continued around the space through all tissues and stops short of the line of the internal mammary artery. Asepsis is a secondary consideration. The hand is pushed through the open intercostal space and seizes the heart within the pericardium, which initially, at any rate, is not opened. The heart is rapidly and rhythmically compressed between the thumb and the remaining fingers and the palm of the hand. The only initial surgical requirement is a pocket-knife. Do not waste time washing your hands or injecting stimulants while the patient's brain cells die. It should be realized that this manoeuvre will maintain an artificial circulation with a blood pressure of perhaps 80 millimetres of mercury, and as an artificial respiration is being maintained by the anaesthetist, the march of death has been halted. If success has not been gained already, now is the time to broaden the attack, without stopping the pumping. A rib spreader may have been fetched, a cuffed Magill tube if not already in the larynx may be able to be inserted quickly; cutting through some costal cartilages may give better access to the heart. Open the pericardium in front of the phrenic nerve; fibrillation is the unusual finding. Without an electrical defibrillator it may be impossible to stop fibrillation, but inject 10 cubic centimetres of 1% procaine solution, or an equivalent type of drug, into the right ventricle in the hope that it will be successful in changing fibrillation into standstill. The drug most likely to restart the heart is adrenaline, one cubic centimetre of a 1:1000 solution taken up in 10 cubic centimetres of saline; inject five to seven cubic centimetres of this mixture into the right ventricle—but at all costs keep up the pumping. Most hearts will start again. I have heard of few recently which did not; the anaesthetist then has a thoracic case on his hands, so must keep up the positive inflation and passive deflation of the lungs while the chest is open, and he blows the air out of the pleural cavity by inflating the lungs as the surgeon closes the chest wall. What results can you expect? If your hand is inside the chest and pumping within 90 seconds of the heart's stoppage, 75% of patients should show full recovery with no mental sequelae. If there is a delay of over five minutes, the end result will have no mind. In between these times there will be various stages of degradation to serve as monuments to wasted time. If you keep your patients well oxygenated always, in a sense wide enough to include such things as hemoglobin levels, and provide



adequate analgesia, either local or systemic, for procedures evoking dangerous reflexes, such as bronchoscopy, you will not experience much cardiac arrest. It rarely arrives out of the blue; observation of the pulse and blood pressure is likely to forestall its occurrence. The doyen of Australian anaesthetists, a year or two ago, made one request in respect of his approaching anaesthetic—that if his heart should stop it should be left alone. This proposition should perhaps be debated only by those who are sufficiently organized and determined to have the patient whose heart has stopped on a machine and his heart in their hand within ninety seconds.

#### Conclusion.

It is very plain to me, and I would beg you most earnestly to believe yourselves, that we have only scratched the surface of our subject this afternoon. Most specialists in any field of medicine undergo a training period of at least two years; the career anaesthetist in Great Britain at present is trained for seven years. Virtually no anaesthetics are given in England other than by specialists or specialists in training. There is no foreseeable prospect of any such limitation of anaesthetic administrators in this country with its vast distances, and the problem is rather what types of anaesthetics are best suited to the general practitioners who will be giving such a large proportion of them. Opinions will no doubt vary greatly on this question; I hope that you have found enough edification, or perhaps even amusement, to recompense you for the time spent listening to me this afternoon, and I should like to ensure that there will be no shortage of ammunition for the discussion to follow by throwing down another gauntlet. A trained anaesthetic colleague may give me, or any one of my family, any type of anaesthetic he chooses, and I will not trouble to inquire what drugs he proposes to use; but I should feel that, if there was need for any surgical procedure remote from that same anaesthetic colleague, the interests of my family would be best protected by my inhaling ether vapour dropped from a bottle on to an open mask. This is merely a personal feeling and should be accepted as such rather than as a dogmatic statement. However, it is possible to state quite dogmatically that an anaesthetic administration has always been a dangerous experience for the recipient, and the over-all picture would appear to be that it has become a more dangerous experience still, with the spread of the newer methods of anaesthesia.

A few references to the readily available *MEDICAL JOURNAL OF AUSTRALIA* may be of interest in extending the ground covered in this talk. You could hardly fail to derive both pleasure and profit from the article by Clive Paton (1953) entitled "Accidents in Anaesthesia" (May 23, page 721). John Woodley (1954) has written on "Modern Anaesthesia with Relation to General Practice" (July 24, page 126). There is a broader background for the more cautious outlook which enshrouds today's discourse (September 5, 1953, page 376), "General Anaesthesia for Dentistry: A Hazardous Field of Practice". The issue of October 23, 1954, gives a complete report of the last meeting of the Australian Society of Anaesthetists.

#### ACTIVE INTERVENTION IN THE TREATMENT OF PULMONARY TUBERCULOSIS.

By S. C. WIGLEY,<sup>1</sup>

From the Tuberculosis Branch, Victorian Department of Health, Melbourne.

It is clearly apparent that these are exciting times for those who are concerned with the management of pulmonary tuberculosis in this country. The fall in the mortality rate of the disease, which was evident before the advent of effective drug therapy and safe thoracic surgery, has accelerated, and although as yet there has

been no significant decline in morbidity from tuberculosis coinciding with this fall in the death rate, there are reasons why this is so, and it can be anticipated that in the near future the activities of the anti-tuberculosis services will result in a decline in morbidity and in a reduction in the number of beds necessary for the management of the disease. These activities are our common knowledge—they include case-finding surveys, the segregation of infectious patients, the provision of adequate rest and comparative riches during the time when they are undergoing treatment, and the protection of susceptible persons. Their successes lead to an inescapable feeling of optimism concerning the future eradication of the disease as a social problem. It is not intended to discuss this view of tuberculosis, but rather to consider one aspect of the therapeutic approach to the disease considered as a problem in individual medicine.

Therapy today is firm in purpose, but not yet composed in character; there are many instances of our uncertainty. Antibiotic evolution has been rapid, but present drug therapy has its limitations. The mode and period of administration of such drugs as one can use are still matters for discussion and improvement, although there is now a general inclination towards continued administration of acceptable combinations of drugs for as long as a useful action can be demonstrated, and longer. A number of factors determine the length of time during which drugs should be given, not the least important being the patient's inclination or capacity to continue with them. The development of convincing drug resistance or noxious side effects of the drugs may limit their usefulness. A recent American communication suggested that at any one time it might be anticipated that up to 10% of patients receiving drug treatment in an institution might need to have such therapy discontinued or modified in some way because of toxic effects of the drugs. Personal experience suggests that our own figures are lower than this. Successful drug therapy and surgery have combined to induce speculation as to the possibility of speeding therapeutic routines. Current inquiry on these lines is incomplete, and to our present knowledge there is no real indication that short cuts in treatment are compatible with safe and successful management. Again, surgical intervention has been facilitated, and intrepid surgeons and patients are engaging in operations—often in the face of widespread disease—which would not have been contemplated within very recent memory, with what results we can only wait to see. Our prospects are not yet clear, but time "shall bring every work into judgement, with every secret thing, whether it be good or whether it be evil".

However, no matter what tomorrow's therapeutic shape may be, I imagine that today it is true to say that there is none among us who believes that we, as doctors, heal patients who suffer from tuberculosis, and I imagine also that we all believe that, at the most, we merely establish a set of circumstances in which the patient is enabled to overcome the disease himself.

I can remember vividly a young woman who walked into the out-patient department of a London chest hospital and told the houseman that she had been an out-patient some seven years before. Reference to the records showed that she had indeed been an out-patient on one occasion, at that time. Her chest X-ray film had shown extensive tuberculous disease in the lungs, with apical cavities, and in the stresses of out-patient practice in wartime London she had been advised to go home and rest. An X-ray film taken on the second visit showed some deposits of calcium in lung fields which were otherwise normal in appearance. Her story revealed that, for seven years, she had been attended by a devoted mother, who had insisted that she abide by the doctor's order and stay in bed. However, she had become tired of this existence, and had come to the hospital to ask if she could not take a more active part in life.

It is not suggested that this story should be the model on which therapy in pulmonary tuberculosis is based; but it does add point to the view that, in the consideration of active intervention in the treatment of tuberculosis of the lungs—that is, treatment procedures other than rest and drug therapy—certain facts must be kept in mind. In the

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first instance, it must be remembered that, despite notable advances in chemotherapy and an established surgical approach to the disease, there has been no lessening in importance of the conception of an immunological balance between the patient and the invading bacillus of tuberculosis. The fate of the infected individual is decided in part by racial and hereditary factors, and natural resistance to the disease may play as significant a role in the outcome as man's ministrations.

The disease is one that is constantly reminding us that its natural tendency is towards healing, and if one loses sight of the natural history of the disease in the enthusiasms engendered by the successes of surgical interventions, one may fall into the error of treating shadows on an X-ray plate rather than patients suffering from tuberculosis.

Secondly, it is still a fact, often unappreciated by patients and rarely by their advisers, that rest of the "whole" man is still the foundation on which the treatment of tuberculosis is laid, and it would be folly to forget that one is dealing with a tuberculous patient, and that treatment does not end with an operation or a course of chemotherapy, no matter how successful either may appear to be initially.

An approach to the problems of active intervention in treatment can be made only from these considerations, because in general terms such action is required only where a mechanical factor is present in the patient's lungs which cannot be overcome under conditions of rest and chemotherapy. With some notable exceptions, the chief aim of active intervention is to control a lesion in the lung which has reached the stage of cavity formation.

Coryllos and Ornstein, and later Price Thomas, have emphasized that cavities in the lungs are formed initially by the rupture of a tuberculous abscess into some part of the bronchial tree. Their persistence (and increase in size) are due not only to further destruction of lung parenchyma, but also to a peculiar set of circumstances existing in the draining bronchus. This is the site of tuberculous bronchitis with a consequent narrowing of the lumen, the degree of which is sufficient to establish a circumstance which allows the entry of air into the cavity during inspiration or the most explosive respiratory acts, but prevents the air from leaving the cavity by the stenosis occurring during expiration, with its attendant relaxation of the bronchial wall. At a later stage, widespread chest wall adhesion and extensive fibrosis in the lung tissue about the cavity may contribute to its persistence. The means of achieving cavity closure which follows this consideration of the relationship between the persisting cavity and the draining bronchus lie in bringing about a lasting closure of the draining bronchus, and this is essentially obtained by diminishing the inspiratory opening force acting on its wall. What was in effect an expiratory stenosis is converted into a functional complete stenosis, and later, with healing of the disease, into an organic stenosis. If the inspiratory excursion is small, and the bronchial lumen is closed throughout the cycle, air will be absorbed from the cavity and it will close; the breach in the lung parenchyma will be closed by compensatory expansion of the surrounding unaffected lung tissue.

It is imperative that every effort should be made to close cavities in the lungs of these patients. Should the cavity remain open, it will continue to provide tuberculous material to the drainage channels of the lungs, the bronchial tree and the intestinal canal, yielding an opportunity for spread of the disease in the lungs and elsewhere. A cavity in the lung, as Price Thomas has observed, is not only the evidence of tuberculosis, but the cause of its persistence in the individual and, it may be added, in the community.

In addition it may be stated that, although the number of patients with unclosed cavities in their lungs who live useful lives for any length of time is greater than has been supposed in the past, they are still relatively few. A recent review from the Frimley Sanatorium in the United Kingdom of the results of collapse therapy and conservative treatment indicated that, although prognosis in the individual case was related closely to the radiological extent

of the disease in the lungs, it was significantly worse in those cases in groups of comparable lung involvement in which the cavity was not closed. The outlook from the point of view of survival and capacity to lead a useful life is materially improved by cavity closure in any particular group defined by extent of disease.

Rest and drug therapy will achieve cavity closure in many cases of pulmonary tuberculosis. However, there remains a residue of cases in which some additional measure must be used to achieve this end. The foregoing offers a rational basis for the use of relaxation therapy in the management of tuberculosis of the lungs. In other cases, mechanical or other problems cannot be solved by these methods, or indeed they may contraindicate their use. The only measures which can offer relief in these circumstances are those which aim to remove diseased tissue—the resection operations.

The methods employed to relieve relaxation of the inspiratory opening tug on the draining bronchus are of two types. Diaphragmatic paralysis with or without concomitant use of pneumoperitoneum, and artificial intrapleural pneumothorax are commonly regarded as temporary methods of dealing with the problem. Artificial extrapleural pneumothorax and thoracoplasty, or modifications of these, involve more extensive surgical operations and are permanent interventions. The manoeuvre chosen is determined by its suitability to the management of the conditions encountered in the patient's lungs, the likelihood of a successful outcome in regard to healing of the disease and the possible complications of the method being borne in mind. It cannot be denied that attitudes towards treatment have changed since the advent of drug therapy, and certainly there has been a considerable reduction in the number of patients needing active intervention to bring about arrest and healing of pulmonary lesions. In addition it can be fairly stated that emphasis has shifted in respect of the use of the various interventions, and speaking generally, permanent methods of management are coming to be preferred to temporary methods. This is not to admit that temporary methods of control cannot or should not now be practised with success in the management of pulmonary tuberculosis, but the indications for their use have narrowed in a striking fashion. (Operations having as their object a direct attack on a pulmonary cavity will not be discussed in this review. Their field of application is extremely limited, and indeed today they have a retrograde flavour.)

Diaphragmatic paralysis, commonly used with a pneumoperitoneum to augment elevation of the hemidiaphragm, is a simple procedure with a limited application. The cavity closure rate in those cases in which it might be supposed to have its greatest use—namely, lower lobe disease—is not sufficiently high (30%) to justify its routine use in these circumstances, but it should be considered for this type of disease. It has a useful application in aiding vertical relaxation in an artificial pneumothorax which is complicated by indivisible apical adhesions, and in some cases it will alter the bronchial relationships and achieve cavity closure in apical lesions in which artificial pneumothorax cannot be obtained.

If this method is employed, care must be taken that treatment is not continued by contemplation, and stock should be taken of the position and the therapeutic plan must be reviewed if necessary early in the course of management. In these circumstances, for instance, tomography often discloses a cavity which shows a regrettable tendency to invisibility in a plain X-ray film.

Phrenic interruption, though simple, is not a harmless operation. It may have serious complications, some of which may not be apparent immediately; not all phrenic nerves recover function after surgical interruption, and I refer particularly to the danger stemming from paradoxical diaphragmatic movement when a thoracoplasty has to be performed in the presence of a paralysed hemidiaphragm. I do not believe that there is any virtue in pneumoperitoneum without phrenic interruption as a means of dealing with pulmonary disease.

A perfect artificial pneumothorax is a most satisfactory way of applying relaxation therapy. The cavity closure rate is high, and if the cases in which it is used are carefully selected, complications are reduced to a minimum. Despite these facts, it is in respect of the use of artificial pneumothorax that we have seen one of the most striking changes in the modern treatment of pulmonary tuberculosis. It is very clear that recent years have seen the rapid decline of artificial pneumothorax as a therapeutic weapon. This decline has been due to some extent to a loss of faith in the measure resulting from a lack of uniformity in the published results of such treatment. Scadding, Nicholson and Hoyle (1951), in a paper which is to be commended, have pointed out that this is due largely to a lack of uniformity of thought about artificial pneumothorax itself. In the past there has been much diversity of opinion about such important features of treatment as the selection of patients, attitudes towards adhesion section, the length of time for which an unsatisfactory artificial pneumothorax should be persisted with, and the period of time for which a satisfactory one should be maintained. This form of treatment was often carried out with apparent immediate success but later failure, because the conditions under which it was managed did not clearly reveal what was in effect a most unsatisfactory state of affairs in the chest.

Be this as it may, I believe that the chief reason for the immediate falling off in the use of artificial pneumothorax lies in the unequivocal success of long-term drug therapy combined with rest in eliminating the indications for the use of artificial pneumothorax in cases in which, at first sight, it might be thought to be applicable. Often in the face of such treatment, active intervention of any sort no longer becomes necessary, or the disease is so modified that the residues are better handled by resection. So complete has been the rout that one is now virtually unable to find patients suitable for artificial pneumothorax therapy despite a firm conviction that the measure is a satisfactory and valuable one.

Should the induction of a pneumothorax be contemplated, three simple principles should be borne in mind: it should be considered an exploratory procedure on trial; it should be abandoned without delay if it is unsatisfactory; and the aim should be to ensure a healed, reexpanded and functioning lung.

Cavities situated anywhere in the lungs are amenable to treatment by artificial pneumothorax. Cavities in certain areas—notably the lingular and axillary segments, the middle lobe and basal segments—do not, in general terms, submit as gracefully to artificial pneumothorax as do those in other sites, but the situation of a cavity is not an absolute contraindication to the induction of a pneumothorax. The contraindications are well appreciated. Main stem bronchostenosis is a major bar. Acute progressive disease, widespread unilateral or bilateral disease, a history of recent pleurisy, chronic fibrotic lesions (indicated by mediastinal shift, narrowed rib spaces, hilar elevation *et cetera*) are important contraindications. Notable disease in other systems and coexisting non-tuberculous disease in the lungs may contraindicate the measure. Rheumatic heart disease, asthma and chronic bronchitis with emphysematous changes in the lungs are important examples.

Pneumothorax can be effected in only a limited number of cases in which it is attempted; but with division of adhesions (almost invariably present, for instance, in association with cavities in the apices of the lower lobes), perhaps supplemented by phrenic interruption, an initially unsatisfactory artificial pneumothorax may be converted into an acceptable one. Today it is open to doubt whether the added risks associated with extensive adhesion section, for example, make persistence with an artificial pneumothorax complicated in this way either profitable or desirable, and I fancy that such a pneumothorax would not be continued.

The case of pneumothorax exemplifies more than any other relaxation measure the difficulty of assessing the place of such measures in the present-day treatment of pulmonary tuberculosis. In this antibiotic age, which

offers a wide choice of therapeutic measures, it seems that artificial pneumothorax is beginning to take shape as a manoeuvre largely of historical interest; but its results in the past have compared favourably with those of other methods when assessed on a basis of survival and ability to return to work and remain at it. In the cases described by Scadding, Nicholson and Hoyle, less than one patient in ten failed to resume work, and two-thirds of the patients returned to their former employment. The critical Frimley review indicated that, provided certain precautions were observed, there was still a place for artificial pneumothorax in treatment, and I wonder if artificial pneumothorax has been set aside too casually, and if some at least of our patients would derive greater benefit from its use in association with drug therapy.

The operation of thoracoplasty is the only relaxation procedure which, if carried out with due attention to certain technical matters, approaches in its results those obtained from artificial pneumothorax. Price Thomas has reported the results in a large series of cases in which a cavity closure and sputum conversion rate of 89.5% was obtained by the operation. These operations were carried out on a wide variety of patients arbitrarily classified into clinical groups—namely, patients with stable chronic disease, relapsing chronic disease and slipping chronic disease. The terms are self-explanatory.

Ideally, the operation should be performed on patients in the first group—those with stable chronic disease; but it is a commonplace that many patients outside this category can be helped to overcome their disease by the operation.

True upper lobe cavities, and cavities in the apical segment of the lower lobe, are accessible by thoracoplasty. The major surgical approach to cavities elsewhere in the lungs should be by other means. It must be insisted that the operation is a relaxation procedure and not a compression operation, and the technical approach to the operation should be directed by this conception. The part played by the physiotherapist in a successful outcome cannot be over-assessed, nor can that imponderable thing—an understanding between the patient and surgeon—be ignored; but possibly the most important factor after the technical one is an acceptance by patient and physician of the principle that the operation is merely an incident in the life of a tuberculous patient, and the mere performing of it does not absolve those concerned with it from the necessity of continuing a routine of rest until healing or arrest of the disease has occurred.

Disadvantages of the procedure that are of some importance, particularly in women, are scarring and deformity. However, even those patients will agree to thoracoplasty if taken completely into the confidence of the surgeon. The part played by the physiotherapist in lessening the deformity cannot be over-emphasized, and what scars or deformity do remain offer no problems to the world of high fashion.

The possible complications of the operation are many; but the most formidable ones are those due to spread of disease—the result of manipulation of diseased lung or of post-operative paradoxical movement of mobilized lung—and reactivation of pre-existing disease in the same or other lung. It is interesting to recall that this question of spread of disease during the course of the operation was the subject of a Medical Research Council investigation with streptomycin, as a result of which it became clear that it was not necessary to "cover" the operation with streptomycin. Spreads could not be prevented by streptomycin, but they responded so well to the drug when they did occur that it was thought that the drug could usefully be reserved for this contingency. Nevertheless, it is still the common practice to use drug therapy at the time of operation and during the period of convalescence from the operation.

Whether upper lobe disease with cavitation is better treated by thoracoplasty or resection is uncertain. It may be said in favour of thoracoplasty that the immediate results are good, the remote results are good, and the ultimate prognosis is better defined than it is for resection.



Certainly a high rate of cavity closure can be achieved. Those who believe that resection is the better procedure in these circumstances may be right. Indeed, the immediate results of resection are good; however, one believes that for patients in the older age groups, thoracoplasty is tolerated better than resection, and moreover there is an opinion which believes that in the long run the removal of tuberculous tissue may not be as beneficial to the patient as the continued presence of healing tissue incarcerated by thoracoplasty.

The operation of extrapleural pneumothorax and modifications of the extrapleural operation, with the use of plombs, have shown extraordinary rises in favour and falls from grace within recent memory.

Ten years ago extrapleural operations went into obscurity—a result of their appalling mortality and morbidity. New anaesthetic methods, the advent of chemotherapy and antibiotic therapy, and the use of plastic materials as plombs, have led to the appearance of a number of modifications of the operation. From observation, many of the patients so managed could conceivably have responded to less radical measures, and many others would have been better served by thoracoplasty or resection. Roberts has laid down simple indications for the operation of extrapleural pneumothorax, which apply equally well to the modifications in which plombs are used. In the course of investigating the results of extrapleural operations performed prior to the advent of chemotherapy, he stated his belief that if the operation was contemplated at all, it should be reserved for persons with apical cavitation and little other visible pulmonary disease (the cavities to be small and not close to the pleura), and further that the operation should be performed only when the history of the illness was short. The history of these operations cannot be ignored. They carry peculiar complications of their own, and I must own to a distaste for any surgical procedure which creates a dead space and fills it with foreign bodies. Baldry, Sumner and Ward (1952) discussed this operation (extrapleural pneumothorax) in the light of their experience with 87 patients who underwent the operation. They concluded that thoracoplasty must remain the most certain operative method of closing upper lobe cavities, and in the face of a high post-operative complication rate and the difficulties associated with the management of the operation, it should be employed only when there is the most urgent "cosmetic and psychological need for preserving the normal contours of the chest".

The development of dissection techniques, close attention to bronchial closure, antibiotic therapy, and safe anaesthesia and resuscitation, have all contributed to the success of resection operations in pulmonary tuberculosis. These facts, allied to a belief that it is wrong to over-emphasize the general systemic nature of the disease when, in many instances, the poor condition of the patient is maintained by local factors in the lung which can safely be removed, have led to an increasing use of resection operations.

The indications for this form of active intervention are now fairly defined, and there is general agreement about certain precise conditions which require resection for adequate treatment. There are also some less well-defined states of affairs in the lungs which can be managed only by removal, and it is possible to state certain principles which govern the decision to use resection procedures in treatment.

One should aim to remove as little functioning lung tissue as is compatible with a successful outcome to the operation; but in assessing the patient's reserves before operation, one should always budget for a resection which involves more tissue than that proposed before operation. This is a highly theoretical consideration in most cases, but technical difficulties may make it necessary to extend the resection, and this contingency should be allowed for.

By and large, the indications for resection can be expressed, I believe, in the principle that it should be used in cases in which the condition in the lungs is not suited for relaxation therapy or actually contraindicates such measures. In addition, when an empyema coexists

with disease in the underlying lung, which in itself demands a permanent method of treatment, resection should be undertaken.

Decisions may often be more difficult to make than perhaps has been implied in the foregoing statement. We are all loath at times to advise resection in certain instances, despite an inner conviction that it should be performed, and I should like to refer to the problem of the solitary tuberculous focus found in the lungs of healthy, symptomless people—the so-called tuberculoma. This term is a radiological one, and it implies that the lesion is the dominant one—that is, it is not the accompaniment of obvious fibrocavernous disease in the same area. (Pathologically satellite foci of tuberculous disease are almost invariably present.) This condition can be regarded as a cardinal indication for a resection.

A study of the natural history of these lesions should resolve all doubts about the advisability of resection. The greater number of these lesions break down within five years of their appearance in the lungs. Their behaviour is entirely unpredictable, they give little indication of the imminence of this breakdown, and it may occur in a catastrophic manner. The broadcasting of previously incarcerated tuberculous material may, and often does, give rise to disastrous spread of disease in the lungs. Relaxation measures change the site but not the nature of these lesions. Their distinction from other solitary lesions in the lungs better managed by resection—notably neoplasm—may be impossible, and this fact offers a compelling reason for their resection. The complications of the operation are negligible, and the remote outlook is uniformly satisfactory.

Another cardinal indication for resection is the presence of main stem bronchostenosis. There is a danger, inherent in this state of affairs, of adding non-tuberculous suppuration to existing tuberculous disease, and resection is advised to forestall or deal with this added burden on the patient.

A less precise indication is that offered by cavitation in unusual sites not easily controlled by simpler methods of treatment. These include basal segmental cavities, apical lower lobe cavities, and cavities in the lingular segment and in the middle lobe. Failure of thoracoplasty to close a cavity and produce sputum conversion is another such indication. The so-called destroyed lung also falls in this category. The organ is invariably cavitated and bronchiectatic, with areas of collapse throughout. This state of affairs not uncommonly represents an "exhausted" tuberculous process with secondary infection the dominant factor.

One last indication for resection is provided by pleural complications, notably tuberculous empyema occurring in circumstances considered in the above-mentioned general principle. This indication, it is thought, includes those rare cases in which acute cavity rupture complicates pneumothorax therapy.

Resection procedures are playing an increasingly important part in the management of tuberculosis of the lungs. They offer something more than can be obtained by relaxation methods, and, viewed in proper perspective, the results are good. Even so, optimism should not stretch the qualities of resection to embrace a belief that removal of demonstrable foci of tuberculous disease will relieve the patient of the burden of tuberculosis. Complications may be formidable, and too often one sees reactivation occurring at sites remote from resected areas, hitherto unsuspected as potential points of relapse. When practised within the limits of the indications referred to, resection can cause none to fret; but it seems likely that over-zealous resort to resection, to the exclusion of less radical and proved alternatives, may have remote results which are far less satisfying than might be expected from their immediate effects. In the long view, however, neither relaxation therapy nor resection can usurp the other's place in the treatment of tuberculosis of the lungs. Each finds its greatest usefulness in cases in which the other cannot be used with profit, and neither intervention can be ignored by the extreme protagonists of the other.



I am sure that it is apposite to repeat the statement, made at the beginning of this paper, that tuberculosis is a disease with a natural tendency towards healing. Given an appropriate environment, patients are, in general terms, quite capable of handling their disease. A much more pressing problem, it seems to me, is to maintain healing after the patient leaves the artificial environment of the sanatorium. In a recent survey at a sanatorium in Melbourne it was thought that 140 patients out of a total of 180 could be converted to a "sputum-negative" state. Of this number it was considered that less than 40 would require active intervention to bring about this conversion. Thirty-seven patients, in fact, required some form of active intervention to enable them to overcome their disease. Five patients were being managed by phrenic interruption with and without pneumoperitoneum; seven patients had artificial pneumothoraces, bilateral in one instance; seven patients had been subjected to thoracoplasty; and 18 patients had undergone or were awaiting resection operations ranging from segmental removals to pneumonectomy. These measures are not to be regarded as alternatives to disciplined rest and chemotherapy, which will be all that is required for the others, but they are merely landmarks in the course of recovery from a disease the treatment of which is fundamentally based on rest.

What of the 40 patients who are beyond conversion? In any sanatorium there is a number of patients for whom active intervention would be foolhardy for a variety of reasons. We must be prepared on occasion to admit defeat in the limited therapeutic sense. But our successes are not to be measured only by cavity closure and sputum conversion, or by the satisfactory removal of diseased tissue. If we can help the patient to establish some measure of control over his disease and secure some physical rehabilitation, and if we can return him to his home and work, impressed with some of the implications of infectiousness in this condition and a sense of social responsibility in respect of his disease, surely this too can be regarded as a successful outcome in management. These patients, all with widespread disease and its sequelae, show a good response to rest and drug therapy. One is unimpressed with the argument that surgery offers the only hope of relief in these instances. It is essential that after surgery the patient should be not only alive, but capable of living; extensive surgery carries a high mortality, and respiratory cripples may result from it. It must always be remembered that, as the Frimley survey shows, one in four of these patients has a good expectation of life for at least eight years without surgical intervention, and a more than one in six chance of being gainfully employed on a full-time basis for this period. Not the least of the rewards of treatment in tuberculosis is the spiritual satisfaction a patient derives from such an outcome.

Finally, reference should be made to an address given by the late J. E. H. Roberts (1944), surgeon to the Brompton Hospital. The title of the paper was: "What is the Right Time, Please?" It makes the following point:

In the treatment of tuberculosis, time, and a long time, has been in the past and, indeed, is today, an essential element. But, in many cases, this time should be spent after and not before the active intervention has taken place.

This point is perhaps well taken by the results in the series of thoracoplasties already referred to. In that series, the mortality rate among those patients operated on within two years of diagnosis was 5%; in those operated on more than two years after diagnosis the mortality rate was 30%. These procedures are never urgent matters, but I hope that it will not seem out of place here to advocate earlier active intervention in cases of tuberculosis of the lungs in which it appears to be needed. In those cases in which the point has been reached at which the patient can be expected to do little more to heal his disease, there should be no undue delay in submitting him to surgical intervention. In this respect surgeons have often chided physicians and accused them of reaction. I believe that there is now no real distinction

between physicians and surgeons in thoracic medicine, and the therapeutic issues are apparent to us all. We are all concerned with patients, suffering from a mischief that has wide implications individually and socially, presenting us with problems that are difficult, frequently exasperating, and often disheartening with their content of personal tragedy. Of probably no other disease is it more truly said that there is more in medicine than physics. From the point of view of active intervention, however, provided these procedures are entered upon with "a right judgement in all things", they can be only a source of benefit to the patient, and of peculiar satisfaction to his advisers.

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### ACCIDENTAL INJURIES IN PRE-SCHOOL CHILDREN: III. BURNS AND SCALDS.

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The first article in this series (Clements, 1955) gave a general survey of the accidents sustained from birth to the sixth birthday by a group of 12,131 boys and 11,653 girls who were the subjects of a special study. Details of the methods used to collect and analyse the data are given in that article.

An analysis of the burns and scalds suffered by the children in this study is given in this paper.

#### Results.

The numbers of children who sustained a burn, distributed according to the nature of the accident and by age groups, are shown in Table I, and the numbers of children who were scalded, distributed in the same manner, are shown in Table II.

An attempt was made to determine the degree of severity of the injury; the criteria used included the extent of the surface involved as told in the history, and the mode of treatment. Children who were kept in hospital for more than twenty-four hours were judged to be severely injured. It is realized that this statement involves an arbitrary decision which is open to a number of criticisms. Since it was applied to all types of burn and scald accidents, it is probably sufficiently firm to allow comparisons to be drawn between the different types of accidents in this series. The numbers and percentages of mild and serious accidents in each category of burns and scalds are given in Tables III and IV.

<sup>1</sup> Endowed by the Commonwealth Department of Health.

TABLE I.  
Distribution of Burns in Relation to Nature of Accident.

Nature of Accident.	Sex.	Number of Accidents at Each Year of Age.						Total Number of Accidents.
		Under One Year.	One Year.	Two Years.	Three Years.	Four Years.	Five Years.	
Fall against or touching hot metal or ashes ..	M.	25	60	69	51	23	13	241
	F.	23	47	54	57	46	16	243
Burnt in fires outside the home ..	M.	5	10	20	20	9	9	73
	F.	2	8	22	11	12	6	61
Hot objects pulled from table or stove ..	M.	4	10	5	6	—	—	25
	F.	2	3	5	6	—	—	16
Direct contact with domestic fires ..	M.	—	5	6	8	4	2	25
	F.	—	2	6	2	—	4	14
Electrical burns ..	M.	1	—	13	9	2	1	26
	F.	—	4	4	1	2	1	10
Chemical burns ..	M.	2	4	5	5	2	—	18
	F.	1	1	4	1	—	1	8
Inflammable liquid ..	M.	—	—	1	2	1	3	7
	F.	2	1	6	6	4	2	21
Insufficient information ..	M.	2	1	7	—	—	1	11
	F.	1	3	2	6	—	1	13
Totals ..	M.	39	90	126	101	41	31	418
	F.	31	67	103	90	64	31	396
Number of children exposed at each year of age	M.	12,131	11,727	10,690	10,690	10,690	10,690	—
	F.	11,653	11,481	10,583	10,583	10,583	10,583	—

None of the accidents suffered by the children in this series was fatal, so that it is not possible to determine the case mortality rate. However, an attempt was made to relate these data to the death rates for burns and scalds for children in all Australia in the three years from 1950 to 1952. The death rates per 100,000 children are given in the appropriate columns in Table V, where for comparison are shown the accident rates for both burns and scalds per 100,000 children as found in this study. The ratio of accident rates to death rates for each age group are also set out.

#### Discussion.

##### Burns.

By far the most common cause of burns is a fall by the child against or on to hot metal or ashes. The majority of these accidents occurred around the kitchen or laundry, where the hot object was a stove, copper, hot saucepan or other heating utensil; a minority fell into ashes in a dying fire inside the house. The equal distribution of this type of accident between the sexes is significant and emphasizes the large number of hazardous situations around the home. The incidence was high even in the first year of life, and rose to peaks in the second and third years, and the rates did not fall until the age of five years. The vast majority of these accidents were mild; only 5% of males and 2% of females were seriously injured.

The dominant position of this group of accidents emphasizes that falls against hot objects are much more frequent now than accidents resulting from the child pulling something on to himself.

The next most prevalent group of accidents were those in which the children were burnt by fires outside the home. The clothes of many of these children caught alight from the fires, the majority of which were started by the children themselves. The remainder had skin burns from actual contact with the flames. A few children were set alight by sparks from fires lit by parents or other adults. The sex difference is not pronounced, and the peaks are in the third and second years of life, when the spirit of adventure and inquiry is high and the self-control is slight. More of these accidents were of a serious nature—12% and 10% respectively for boys and girls.

Accidents caused by pulling hot objects from the stove or table form the next group, which is unimportant after three years of age, when the child has apparently learnt of this hazard and can see over the edge of a table. This group of accidents should not be confused with scalds (Table II) which result from a hot liquid pulled from the stove or table. In the average home there are many more utensils on tables or the stove containing hot liquid than there are hot solid objects. There is a distinct masculinity in this group of accidents. Injuries were mild except in one case.

TABLE II.  
Distribution of Scalds in Relation to Nature of Accident.

Nature of Accident.	Sex.	Number of Accidents at Each Year of Age.						Total Number of Accidents.
		Under One Year.	One Year.	Two Years.	Three Years.	Four Years.	Five Years.	
Hot liquid pulled or knocked over by child	M.	36	86	73	39	17	25	276
	F.	19	72	68	36	22	12	229
Child fell into hot liquid ..	M.	1	9	12	7	4	4	37
	F.	—	5	8	8	6	—	27
Adult spilt hot liquid on child ..	M.	3	11	12	2	5	5	38
	F.	5	2	9	2	5	3	26
Scalded by steam from kettle <i>et cetera</i> ..	M.	4	1	2	4	6	1	18
	F.	2	—	1	2	4	4	13
Placed in hot water by adult ..	M.	2	1	2	4	3	2	14
	F.	—	—	—	1	1	—	2
Insufficient information ..	M.	7	9	8	12	3	5	44
	F.	3	4	7	4	5	3	26
Totals ..	M.	53	117	109	68	38	42	427
	F.	29	83	86	60	43	22	323

A burn resulting from direct contact with a domestic fire accounted for 39 accidents, or something under 5% of the total. This is in contrast with the distribution of burns in a large series in England investigated by Colebrook and Colebrook (1949); in their series almost 60% were due to direct or indirect contact with a domestic fire. Open fireplaces are much more common in England than in Australia. In our series the children burnt in this way were fairly evenly distributed through each group, except under one year, in which group an accident of this type did not occur. It is important to note that this type of accident was attended by far the highest percentage of seriously affected children.

The electrical burns group includes accidents arising from hot electric irons, toasters and radiators. Although 38 children were burnt in this way, the number is but a small percentage of the total affected. Most of these accidents were of a mild nature.

TABLE III.  
Severity of Burns.

Nature of Accident.	Sex.	Mild Burns.	Severe Burns.	Total.
Fall against or touching hot metal or ashes.	M.	228 (95%)	13 (5%)	241
	F.	240 (98%)	3 (2%)	243
Burnt in fires outside the home ..	M.	64 (88%)	9 (12%)	73
	F.	55 (90%)	6 (10%)	61
Hot objects pulled from table or stove.	M.	24	1	25
	F.	16	—	16
Direct contact with domestic fires	M.	21 (84%)	4 (16%)	25
	F.	9 (64%)	5 (36%)	14
Electrical burns .. .. .	M.	23	5	28
	F.	8	2	10
Chemical burns .. .. .	M.	14	4	18
	F.	7	1	8
Inflammable liquid .. ..	M.	4	3	7
	F.	16	5	21
Insufficient information ..	M.	11	—	11
	F.	13	—	13

The other types of burns do not call for particular comment.

#### Scalds.

The most important cause of scalds was hot liquid pulled or knocked over by the child; this accounted for about two-thirds of all scalds; approximately 20% of these were of a serious character. Included in this group are the accidents which resulted from a child knocking an adult carrying a container of hot liquid. In a high percentage of these accidents hot tea was the liquid involved.

Although there were peaks at the ages of one and two years, the levels are high at the other ages. In the younger age groups, many accidents were due to the child's pulling a table cloth or similar article to assist it to stand up

or climb up; at ages over the second birthday a significant number were due to the child's knocking a table or person and so upsetting the liquid. The normal activity of children must find an outlet, and in flats and small homes with restricted space there is often not enough room for the runabout to move without collisions with the furniture.

The next most important group of accidents were those which resulted from a child falling into hot liquid. The sites ranged from the laundry with hot water in a copper or tubs to the bathroom. In the majority of instances the children fell in after climbing to the edge of the container. In most of the remainder the mother had placed the child on the edge of the container. It will be noted that most of these accidents occurred in the second to fourth year of life, at the height of the child's restless inquisitiveness. A relatively high percentage of these accidents are of a serious nature, largely because of the area of the body involved.

TABLE IV.  
Severity of Scalds.

Nature of Accident.	Sex.	Mild Scalds.	Severe Scalds.	Total.
Hot liquid pulled or knocked over by child.	M.	217 (79%)	59 (21%)	276
	F.	187 (82%)	42 (18%)	229
Child fell into hot liquid ..	M.	25 (67%)	12 (33%)	37
	F.	21 (80%)	6 (20%)	27
Adult spilt hot liquid on child ..	M.	32 (86%)	6 (15%)	38
	F.	19 (73%)	7 (27%)	26
Scalded by steam from kettle <i>et cetera</i> .	M.	15 (84%)	3 (16%)	18
	F.	11	2	13
Placed in hot water by adult ..	M.	11	3	14
	F.	2	—	2
Insufficient information .. ..	M.	31	13	44
	F.	24	2	26

Another group are those children on whom an adult has spilt hot liquid. The child was not a contributing factor in these accidents, whereas he was in many of those in the first category. From the nature of the accident it would be expected that the distribution through the age groups would be fairly uniform, and so it seems it was. A relatively high percentage of these accidents were of a serious character.

The other types of scalds were not numerous and do not call for particular comment.

#### A Comparison of Burns and Scalds.

When the accident rates for burns and scalds are compared (Table V), it is seen that the differences are not pronounced. However, a much higher percentage of scalds were of a serious nature (Tables III and IV), and the death rates (Table V) in the community for scalds are

TABLE V.  
Comparison of Accident Rates in This Series with Death Rates for Australia, 1950 to 1952.

Age Groups.	Burns.						Scalds.					
	Males.			Females.			Males.			Females.		
	(a) Accident Rates per 100,000. <sup>1</sup>	(b) Death Rates per 100,000. <sup>2</sup>	Accidents. <sup>3</sup> Deaths.	Accident Rates per 100,000. <sup>1</sup>	Death Rates per 100,000. <sup>2</sup>	Accidents. <sup>3</sup> Deaths.	Accident Rates per 100,000. <sup>1</sup>	Death Rates per 100,000. <sup>2</sup>	Accidents. <sup>3</sup> Deaths.	Accident Rates per 100,000. <sup>1</sup>	Death Rates per 100,000. <sup>2</sup>	Accidents. <sup>3</sup> Deaths.
Under 1 year	321	1.0	321	267	2.9	92	436	4.4	99	248	2.5	90
1 year ..	767	2.8	273	583	1.9	302	997	10.6	94	722	5.2	138
2 years ..	1178	4.6	256	973	3.0	327	1019	7.2	141	812	4.1	198
3 years ..	944	2.1	449	850	3.8	223	636	1.1	578	566	2.6	217
4 years ..	383	2.2	174	604	3.9	154	355	0.4	887	406	1.9	213

<sup>1</sup> (a) Accidents per 100,000 years of life experienced in the survey.

<sup>2</sup> (b) Deaths per 100,000 years of life experienced in the Australian population.

<sup>3</sup> The ratio (a):(b); a measure proportional to the case fatality rate.



much higher than those for burns. A review of individual cards in this study suggests that the average area of the body injured by scalds was greater than the average area of the body affected by burns. For both burns and scalds the second and third years of life seem to be the most critical; the accident rates are relatively very high, so that the ratio of accidents to deaths is lowest; particularly is this so for scalds.

#### Prevention.

In their survey of 1000 cases of burns and scalds, the Colebrooks (Colebrook and Colebrook, 1949) attempted to separate the accidents which in their opinion were preventible. They recognized that this was beset with difficulties; too little allowance might be made for the peculiar circumstances in which the responsible adult was placed at the time, and too little significance given to the characteristics of child development, which in certain circumstances might be a major factor in the production of the accident. They regarded burning accidents associated with an unguarded fire as preventible; when a spark set a child's frock alight, this was judged unpreventible. Scalds produced when tea or other hot liquid was knocked or pulled over were regarded as preventible (the containers should have been placed out of reach), as were accidents due to the child's falling into hot water or being put into hot water.

The Colebrooks judged that 55% of the home burns and 45% of the home scalds were preventible. From a review of the case records of this study, we judged that nearly 70% of both the burns and scalds were preventible by the exercise of a reasonable degree of forethought and caution by the adult in the situation.

Failure by the adult to put himself or herself in the position of the child is a factor in all childhood accidents, but it probably applies more strongly to burns and scalds than any other type. With his greater knowledge of a particular situation, together with experience, the adult appreciates the hazards of the situation, but fails to realize the child's ignorance of these. A classical example is that of the mother who tearfully told a coroner that when she sat her young child on the side of a copper of hot water she had not imagined that he would fall into it, because she would not have done so had she been sitting there. This is an extreme example of adult reasoning being applied to a situation which predominantly involved children.

The majority of both burns and scalds in this series occurred because the child was unaware that the article was hot or that the container was filled with a hot liquid; this was due partly to his educational immaturity, and partly because he could not either see the container or see into it. The keynote of prevention of a high percentage of this type of accident depends upon the adults having some knowledge of what a child can be expected to do in a particular situation and in removing the hazard in anticipation. This may involve placing a hot article out of reach or erecting a suitable guard. Every situation and the appropriate parental action cannot be detailed, nor is this desirable; far better that the parents should accept the principle enunciated above and work out an action for each situation than that an incomplete series of situations should be catalogued.

Protective actions by adults are not enough; during the second year of life the deliberate education of the child in respect of the hazards of this type of accident should be started. As Dietrich (1950) has pointed out, the twenty-months-old baby must be taught to stay away from the kitchen stove, the laundry copper *et cetera*. A series of instructions, "don'ts" and "do's" is not enough; children learn through experience, and many of the hazards around the home can be used as teaching material. In addition to telling the child that the stove is hot, the mother should take the child's hand and place it on a warm, but not hot, stove on a number of occasions, repeating the word "hot" (or similar word) when she does. Similarly, learning experiences can be developed around other fixed household equipment which from time to time is a hazard.

The attitude of the mother in these teaching sessions is most important; she should be affectionate and sympathetic and the whole atmosphere must be casual and relaxed, so as not to arouse any anxiety or fear in the child.

A number of burns were the outcome of children playing with matches. There is no doubt that matches fascinate children, and rather than prohibit children from having experience with matches at a relatively young age, Dietrich takes the view that children should be encouraged to light matches under adequate supervision. He suggested that this may start with the lighting of a cigarette for a member of the family. Later, when the child shows undue interest in matches, he should be taken to the driveway or other safe place and encouraged to strike and burn through a whole box of matches. Dietrich holds that such experience often satisfies a child's interest in matches, and in addition gives him an idea of the heat of a burning match, which in itself is a useful lesson.

The burden of prevention of burns and scalds in children rests with the parents. They need help to understand the characteristics of child development, which should form the basis of both their protective and their educational measures. The family physician can help parents in this matter in two ways: by giving advice on the characteristics of child development, at the same time as he gives advice on infant feeding and general management, and by drawing attention to obvious hazards when he sees them during a home visit.

#### Summary.

1. The burns and scalds which occurred among 12,131 boys and 11,653 girls aged under six years, who were the subjects of special accident survey, are reported here. These types of accidents occupy second place in magnitude in this study, being exceeded only by falls.
2. Of the children in this study, 418 (3.4%) boys and 396 (3.4%) girls were burnt; 427 (3.5%) boys and 323 (2.8%) girls were scalded.
3. Of the children burnt, 39 (9.3%) boys and 22 (5.5%) girls were seriously injured; of the children scalded 96 (22.4%) boys and 59 (18.2%) girls were seriously injured.
4. The prevention of the various types of accidents is discussed.

#### Acknowledgements.

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#### THE ERYTHROCYTE SEDIMENTATION RATE OF FINGER BLOOD.

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ESTIMATION of the erythrocyte sedimentation rate is often useful in diagnosis, and serial measurements are valuable in following the progress of some diseases. However, the methods for estimation which are most commonly used, the Westergren and Wintrobe techniques, require venous blood, and venepuncture is sometimes inconvenient, especially in children. To overcome this disadvantage many

micromethods have been described which use small quantities of blood obtained by pricking a finger. There is a great deal of variation among these methods in the size of tube and the concentration and type of anticoagulant used, but in most reports a sedimentation rate less than 10 millimetres in one hour is regarded as normal (Herzog, 1941). However, the true status of micromethods has never been satisfactorily defined, and there is considerable scepticism about the accuracy of the methods and of the commonly accepted normal values.

Herzog refers to the published results of many other workers and to his own results in 2600 tests with a micromethod. The mean of 1165 tests in normal children and young adults was 8.5 millimetres in one hour; but the figures ranged as high as 18 millimetres. Smith (1936), using the special pipettes he described to measure the sedimentation rate of citrated blood, found the rate in 60 normal infants and children to range from one to eight (mean 4.2) millimetres in half an hour, and from three to 13 (mean 9.1) millimetres in one hour. A macromethod in which venous blood was used gave readings almost identical with the micromethod in which capillary blood was used.

Clinicians are, in general, more familiar with the estimates of sedimentation rate derived from venous blood by the Westergren and Wintrobe methods. But even with these methods there is no unanimity of opinion regarding the permissible range of normal values (Cecil and Loeb, 1951; Walsh *et al.*, 1953; Whitby and Britton, 1953; Wintrobe, 1952). Because of this, and because it is not possible to test any particular method in terms of the fundamental factors governing erythrocyte sedimentation, since these are not fully understood, we have examined the reliability of a micromethod which is in common use by comparing it with the Westergren method.

#### Methods.

##### Micromethod.

The ordinary micromethod for measuring the sedimentation rate of blood was used. The tubes, as supplied from Hawksley and Sons, Limited, have an internal diameter of about 2.5 millimetres, except for the tip, which is narrower, and they hold a column of blood about 38 millimetres in height. First, 3.8% sodium citrate solution is taken up to the mark C—that is, 0.04 millilitre. Blood from a finger-prick is then encouraged to move up the tube by capillarity, mixing with the anticoagulant solution, to the mark B (0.20 millilitre). Finally this blood and citrate mixture is expelled on to a watch glass, mixed thoroughly and then allowed to fill the tube to the zero mark. The tube is fixed vertically, and the sedimentation rate is read as the distance through which the upper layer of cells has fallen in sixty minutes.

##### Westergren Method.

Venous blood was added to measured amounts of 3.8% sodium citrate solution in test tubes to give the correct mixture of four parts of blood to one of citrate solution. Westergren tubes, 200 millimetres in length and 2.5 millimetres internal diameter, were filled by suction, placed vertically in special stands and read in the usual way.

##### Procedure.

Measurements were made of the sedimentation rates of blood in 50 subjects by both the micromethod (finger-blood) and the Westergren method (venous blood). In most cases the sedimentation rates of venous blood were also measured in the microtubes, the tubes being filled by suction with the blood-citrate mixtures used for the Westergren method. Measurements were made in duplicate in many instances. Readings were taken at thirty minutes as well as at sixty minutes.

##### Results.

##### Comparison of Results by Micromethod and Westergren Method.

The relationship between the sedimentation rates of blood taken simultaneously from a finger and from a vein, and measured by the micromethod and the Westergren

method respectively, is shown in Figure I. The curve is almost linear for the slower rates of sedimentation, and the linear regression for points having Westergren values of 20 millimetres or less in one hour is shown inset. The correlation coefficient for these points is 0.88, and the equation to the line,  $y = 1.74 + 0.63x$ .

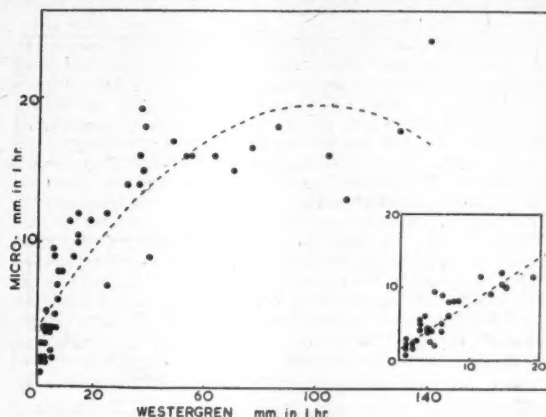


FIGURE I.

The erythrocyte sedimentation rate of finger blood estimated by the micromethod and of venous blood by the Westergren method.

Figure II shows the relation between the readings made at thirty minutes by the micromethod and the ordinary Westergren measurements. Again, there is a linear relation for the observations with Westergren values of 20 millimetres or less; but the scatter is less than with the readings made at one hour: the correlation coefficient is 0.91 and  $y = 0.30 + 0.41x$ .

The micromethod readings which correspond approximately to Westergren values of 10 and 20 millimetres in one hour are as shown in Table I.

TABLE I.

Westergren Method. (One Hour.)	Micromethod at	
	30 Minutes.	60 Minutes.
10 millimetres ..	4.5	8.0
20 millimetres ..	8.5	14.5

When the micromethod result was five millimetres or less in half an hour or ten millimetres or less in one hour, then the sedimentation rate of venous blood by the Westergren method rarely exceeded 10 millimetres in one hour. Changes in the rate of sedimentation are reflected in the measurements obtained by both methods when the rates are normal or only moderately raised. With rapidly sedimenting blood the micromethod is relatively insensitive to changes in rate. Any reading by the micromethod of more than 10 millimetres in half an hour or 15 millimetres in one hour may correspond to a Westergren value of anything from 40 to 140 millimetres in one hour.

Analysis of the duplicate measurements made by the micromethod showed that the standard deviation was close to 1.0 millimetre. There was no consistent difference between the readings of the first and second tubes filled with the blood squeezed from the finger-prick. The standard deviation of the Westergren observations was 1.1 millimetres for all readings and 1.7 millimetres for the readings greater than 20 millimetres in one hour.



These errors are too small to contribute materially to the differences in sedimentation rates as measured by the two methods. Other factors which are possibly concerned are the difference in sites—capillary blood from the finger for the micromethod, venous blood for the Westergren method—and differences in the conditions *in vitro* in the two techniques. The importance of these factors can be evaluated by further examination of our observations.

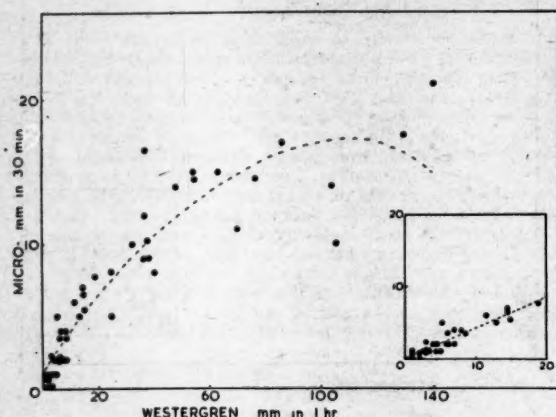


FIGURE II.

The micromethod reading at thirty minutes compared with the Westergren estimate of erythrocyte sedimentation rate.

*Site Difference: The Sedimentation Rates of Finger Blood and Venous Blood.*

The results obtained in 44 subjects by using one method, the micromethod, on blood from both sites, finger and vein, are shown in Figure III. The correlation coefficient

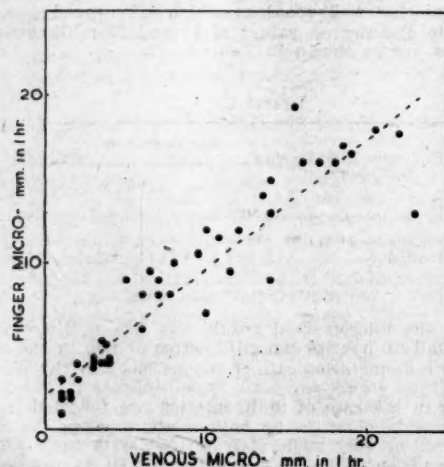


FIGURE III.

The sedimentation rates of finger blood and venous blood measured in microtubes.

is 0.93 and the linear regression shows that there is very little, if any, systematic difference in the sediment-forming properties of blood taken from the two sites. However, considerable variation occurs in the samples taken from different subjects, probably owing to inconstancy in the citrate dilution of finger blood, the effects of transporting some of the tubes of finger blood from the wards to the laboratory and other technical points.

Even if there is any difference in the sedimentation rates of blood from the two sites, the difference is small and cannot account for the gross differences in rates recorded by the micromethod and the Westergren method. Obviously the physical factors must be more important.

*Differences Due to Technique: The Sedimentation Rates of Venous Blood Measured by Both Micromethod and Westergren Method.*

When both methods were used to measure the sedimentation rate of the same samples of blood (citrate venous blood), we were able to show clearly how the physical characteristics of the tubes affect the results. Observations made in this way in 46 subjects are shown in Figure IV.

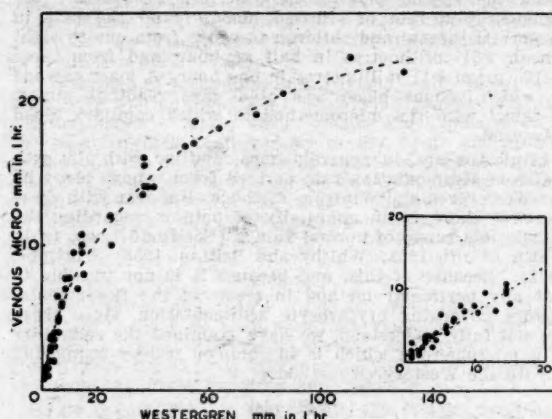


FIGURE IV.

The sedimentation rate of venous blood measured by both Westergren and micromethods.

The results of the two methods are related in much the same way as those in Figure I, but there is less scatter of points about the regression curve. The scatter has been reduced because the variations which are introduced by using the two methods on blood from different sites have been eliminated. Since the tubes used in both these methods have the same bore, the physical characteristic which determines the shape of the curve relating the results of the two methods is the length, or rather the effective length, of the tubes. Effective length is the maximum length over which sedimentation can possibly be observed—that is, the length of the column of plasma, the total length of the tube *minus* the length occupied by the cells when packed. The greater the haematocrit, the less the effective length of the tube.

The influence of packed cell volume, or haematocrit, is illustrated in the following experiments. Washed human red cells were mixed with 0.5% and 3% dextran solutions to imitate specimens of blood having slow and rapid rates of sedimentation respectively, and haematocrit values ranging from 19% to 50%. Duplicate estimations of the sedimentation rates of each sample were made with microtubes and with Westergren tubes. Table II (a) gives the results for the mixtures with slow sedimentation. Haematocrit has a profound influence, but the rates recorded by the two methods are identical. The results for the mixtures with rapid sedimentation are given in Table II (b). Again, the influence of haematocrit is very great and affects the rates recorded by the micromethod to much the same extent, proportionately, as the rates found in Westergren tubes. However, the actual rates observed in the two methods are very different. The manner in which sedimentation proceeds in the two tubes can be seen more clearly when readings are taken at frequent intervals instead of just once at the end of a fixed period. The observations made in this way for one sample of blood are shown in Figure V. The results given by the two methods differ



widely when sedimentation rate is expressed in the usual terms—distance through which the cells fall in one-half or one hour. In terms of the maximum rate of fall developed by the cells, the results are approximately the same.

TABLE II.

The Effect of Haematocrit on Sedimentation (Millimetres in One Hour) of Cells in 0.5% Dextran Solution (a) and in 3.0% Dextran Solution (b).

Method.	Haematocrit.			
	19%	30%	36%	50%
(a) Dextran solution, 0.5% :				
Micromethod .. .. .	11.5	7.0	5.0	1.0
Westergren .. .. .	11.5	6.5	5.0	1.0
(b) Dextran solution, 3.0% :				
Micromethod .. .. .	26.0	23.0	19.0	16.0
Westergren .. .. .	163.0	142.0	133.0	90.0

### Discussion.

The principal conclusion to be drawn from the results of this study is that the Westergren technique for measuring sedimentation rate will give approximately the same reading as the micromethod, but only for slow rates—in fact, only over a range of rates which is probably within the limits of normality. The results of the two methods correspond in these circumstances in spite of differences

readings. However, this is so only because of the way in which sedimentation is conventionally recorded—that is, the distance through which the mass of cells falls in a standard time, usually one hour. This can be better appreciated by considering the mechanics of sedimentation.

There are three stages in the sedimentation of erythrocytes. First, the cells aggregate into clumps or rouleaux. Then there is a period during which the cells fall freely at a more or less constant rate. Finally, the rate of fall decreases and eventually ceases as the cells gradually pack into the lower part of the tube. The most important single factor concerned in sedimentation is rouleaux formation, which in turn is determined by complex physico-chemical properties of plasma (Hardwicke and Squire, 1952). Few or no rouleaux form in normal blood; but with abnormally rapid sedimentation the rate of fall in the second stage is directly related to the average length of rouleaux. The whole purpose of estimating sedimentation rate is to detect the presence, and if possible to obtain a quantitative measure, of the changes in plasma induced by diseases which increase the tendency of red cells to stick together. Ignorance of the true nature of all these fundamental changes forces us to restrict our observations to the effects they have on red cells, the rate of sedimentation being accepted as a measure of the extent of rouleaux formation, which in turn is taken to indicate the degree of activity of any disease process which may be present.

Obviously, it is the rate of fall in the second stage of sedimentation which is important. But when a reading is taken only after a given time has elapsed, as in the standard method of recording results, packing may have commenced, in which case the reading is not a true indication of the behaviour of the cells in the second stage. When sedimentation proceeds sufficiently rapidly for the second stage to have terminated before the accepted time for reading falls due, then the reading gives us nothing more than a measure of the length of the column of plasma in that tube, and an indication that the sedimentation rate, the true rate, is at least as rapid as the reading suggests. The faster sedimentation proceeds, the sooner packing occurs; but the final reading cannot exceed the effective length of the tube—that is, the total length of tube minus the haematocrit value for the blood mixture—which determines the limit to the range of rates which can be usefully measured in any particular tube. Obviously the range of usefulness of a short tube such as the one used in the micromethod is less than that of the long Westergren tube. In fact, the range of rates over which the micromethod is sensitive scarcely extends beyond the limit of normality accepted by some authors. Therefore, the micromethod is of greater value in distinguishing normal from abnormal rates than for following serial changes in sedimentation rates.

But all this holds only for the conventional method of recording results. The range of usefulness is increased, though still subject to some restriction imposed by length of tube, if observations are confined to the second stage of sedimentation, the stage of fall. As is obvious from our results, particularly those shown in Table II (a) and Figure V, cells aggregate in much the same way in both the Westergren and micromethods, and begin to fall at about the same rate. If sedimentation rate was defined as the maximum or mean rate of fall developed during the second stage, then the estimates given by the two methods would be comparable over a much wider range than obtains with the conventional method of recording. This has been well recognized, emphasized and proved by Cutler (1940). The only drawback is that observations have to be made at frequent intervals during sedimentation instead of only once at the end of one hour. This refinement of technique would enhance the value of all methods, but especially those in which short tubes are employed. Whether such a refinement is worth while for ordinary clinical assessments is doubtful, but it offers considerable advantages when the micromethod is being used, as in the case of children, in following carefully the effects of disease and treatment or in clinical trials.

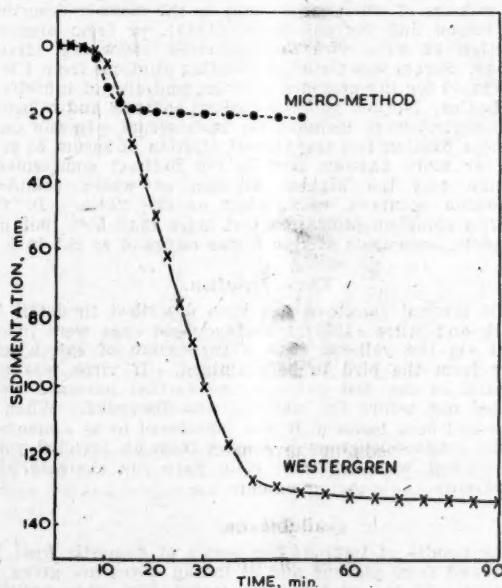


FIGURE V.

The progress of rapid sedimentation in both methods.

in technique and possible differences in the composition of blood taken from different sites. For abnormally rapid rates the results obtained by the two methods differ widely, and for any particular reading given by the micromethod it is impossible to predict what the corresponding Westergren reading will be. The micromethod is clearly much less sensitive than the Westergren method, and is more useful for distinguishing normal from abnormal than for following serial changes in erythrocyte sedimentation rates.

Naturally, the difference in length of the tubes used in the two methods, 40 millimetres in contrast to 200 millimetres, is a major cause of the observed differences in

### Summary.

Measurements were made of the erythrocyte sedimentation rate of citrated finger blood by a micromethod and of citrated venous blood by the Westergren method.

The results were linearly related for slow rates of sedimentation: 10 millimetres in one hour, Westergren, corresponded approximately to five millimetres in half an hour or 10 millimetres in one hour by the micromethod.

Duplicate measurements showed a standard deviation of 1.0 millimetre for readings by the micromethod.

The erythrocyte sedimentation rate of the venous blood was also measured in the microtubes, and it was found that the differences in rates recorded by the two methods were due mainly to the difference in length of the tubes and not to any difference in the blood taken from the two sites.

Results of other experiments emphasized the importance of the haematocrit.

Estimates made by the two methods would correspond over a wider range of rates, and therefore the usefulness of the micromethod would be increased, if results were expressed as the maximum rate of fall developed in the second stage of sedimentation, as advocated by Cutler.

### Acknowledgement.

We are grateful to Miss M. B. Concepcion for advice and assistance in analysing the results.

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## PSITTACOSIS AMONG BIRDS IN CONTACT WITH MAN.

By D. SURREY DANE<sup>1</sup> and MARGARET BEECH,<sup>1</sup>

From the Institute of Medical and Veterinary Science, Adelaide.

In a survey of normal people in South Australia, 22% were found to have demonstrable complement-fixing antibodies to the psittacosis-lymphogranuloma group of viruses (Dane, 1955a). One possible explanation for this was that subclinical infection with psittacosis virus<sup>2</sup> occurred more frequently than had previously been suspected. In this State psittacosis virus had been isolated frequently from several species of wild psittacine bird, and also it was known that aviary birds were commonly infected (Beech and Miles, 1953). To give a more complete picture of the amount of infection present in birds which have direct or indirect contact with man, further investigations have been made.

<sup>1</sup>Assisted by grants from the National Health and Medical Research Council.

<sup>2</sup>The term "psittacosis virus" is used in this paper to include all bird viruses of the psittacosis-ornithosis subgroup.

### Materials and Method.

#### Birds Examined.

1. Domestic fowl. Sixty sera were tested; 31 were from 12 different flocks in the Murray Valley area, and 29 from 16 different flocks in the Adelaide district.

2. Tame pigeon (*Columba livia*). Sera from 100 adult pigeons purchased from a number of different dealers were examined. Virus isolation was attempted from 12 of these birds.

3. Feral pigeon (*Columba livia*). Sera from one juvenile and eleven adult birds trapped in Adelaide were examined. Though none of these birds was banded, it is possible that some had escaped from captivity.

4. Crested pigeon (*Ocyphaps lophotes*). Virus isolation was attempted from 27 of these birds collected in settled areas near Adelaide.

5. Indian dove (*Streptopelia suratensis*). Forty-one of these birds were trapped in Adelaide gardens. Virus isolation was attempted in each case, but only 21 were examined serologically.

6. House sparrow (*Passer domesticus*). Nineteen birds were obtained from a farm on the outskirts of Adelaide, and 56 from Roseworthy College farm. Virus isolation was attempted.

#### Serological Tests.

The complement-fixation test and the indirect complement-fixation test were performed as described by Beech and Miles (1953). The group antigen used was prepared either from a parrot strain of psittacosis virus grown in the yolk-sac of embryonated eggs in the manner described by Bedson and his colleagues (1949), or from enzootic abortion of ewes virus as described elsewhere (Dane, 1955b). Serum was tested at doubling dilutions from 1 in 5 to 1 in 40 for the presence of fixing and also of inhibiting antibodies. Normal yolk-sac antigen controls and a hemolytic control were included for each serum. In the complement fixation test the highest dilution of serum to give 50% or more fixation, and in the indirect complement-fixation test the highest dilution at which complete inhibition occurred, were taken as the titres. In the indirect complement-fixation test more than 50%, but not complete, hemolysis at 1 in 5 was recorded as  $\pm 1$  in 5.

#### Virus Isolation.

The method employed has been described in detail by Beech and Miles (1953). Embryonated eggs were inoculated via the yolk-sac with a suspension of spleen and liver from the bird to be examined. If virus was not isolated on the first passage, two further passages were carried out before the material was discarded. When a virus had been isolated, it was considered to be a member of the psittacosis group if smears from an infected yolk-sac stained with Gimms's stain gave the characteristic appearance.

#### Results.

The results of tests on the serum of domestic fowl, of tame and feral pigeons and of Indian doves are given in Table I. Of the 60 fowl sera tested, 52% gave positive results to the indirect complement-fixation test, but none gave positive results to the complement-fixation test. Of the 100 tame pigeons tested, 84% gave positive reactions either to the indirect complement-fixation test or to the complement-fixation test, or to both tests. In cases in which a specimen of serum reacted in both tests, the complement-fixation test showed a prozone. In Table I, for the sake of simplicity, such sera have been recorded as giving positive results to the complement-fixation test only. Twelve feral pigeons were tested, and only two of these had demonstrable antibody. The 21 sera from Indian doves all gave negative results. There were no  $\pm 1$  in 5 reactions to the indirect complement-fixation test with any of the Indian dove sera; but with the fowl and pigeon sera, among which there were many undoubted positive reactions, a number of  $\pm 1$  in 5 titres were also found. For this reason titres of  $\pm 1$  in 5 in the indirect complement-



TABLE I.  
Serological Tests.

Birds Investigated.	Number Tested.	Indirect Complement Fixation Test : Titre.					Complement Fixation Test : Titre.					Number of Positive Results.	Number of Negative Results.
		$\pm 5^1$	5	10	20	$\geq 40$	5	10	20	40	$\geq 40$		
Domestic fowl:													
From Adelaide	29	4	1	1	4	8	0	0	0	0	0	18 (52%)	11
From Murray Valley	31	6	2	2	0	3	0	0	0	0	0	13 (42%)	18
Pigeon:													
Tame	100	3	4	3	1	14	2	8	7	9	33	84 (84%)	16
Feral	12	0	0	0	0	0	0	1	0	0	1	2	10
Indian dove	21	0	0	0	0	0	0	0	0	0	0	0	0

<sup>1</sup> Reciprocal of serum titre.<sup>2</sup> Titres of  $\pm 1$  in 5 have been included as positive results (see text).

fixation test were considered more likely to represent low level antibody than non-specific reactions, and therefore have been included as positive reactions in Table I.

Virus isolation was attempted from 12 of the tame pigeons giving positive reactions in order to obtain some idea of the proportion of birds with positive serological findings which had demonstrable latent infections. The results of this experiment are shown in Table II. Virus was isolated from half of the birds; but there appeared to be no relationship between the serum titre and the presence of demonstrable virus. It is of interest to record that the spleens of all these birds were small and appeared normal on macroscopic examination.

TABLE II.  
Virus Isolations from Pigeons Giving Positive Serological Findings.

Number.	Indirect Complement Fixation Test : Titre.	Complement Fixation Test : Titre.	Virus Isolation.
1	5 <sup>1</sup>	10	-
2	$\leq 5$	20	-
3	$\leq 5$	40	+
4	$\leq 5$	160	+
5	$\leq 5$	320	+
6	$\leq 5$	320	-
7	$\leq 5$	640	+
8	$\leq 5$	640	+
9	$\leq 5$	1280	-
10	10	1280	-
11	10	1280	+
12	5	2560	-

<sup>1</sup> Reciprocal of serum titre.

The results of attempts at virus isolation from pools of liver and spleen of sparrows, of crested pigeons and of Indian doves are shown in Table III. Five of the 11 pools

TABLE III.  
Virus Isolations.

Species.	Number Examined.	Size of Pools.	Number of Pools.	Number of Pools Giving Positive Results.
House sparrow:				
From Roseworthy	56	5 or 6	11	5
From Adelaide	19	3 or 4	5	0
Indian dove	41	3 or 4	11	0
Crested pigeon	27	2, 3 or 4	10	0

of organs from 56 sparrows caught at Roseworthy yielded virus, which indicated a fairly high rate of infection in this area; but no virus was isolated from 19 sparrows caught in Adelaide. No virus was isolated from the 27 crested pigeons or 41 Indian doves. Twenty-one of these Indian doves had given negative serological results.

## Discussion.

Psittacosis infection has been shown to be both common and widespread among domestic fowl in South Australia, but whether these birds are an important source of infection for man is not known. Fowls have been incriminated as the source of infection in human cases of psittacosis elsewhere (Meyer and Eddie, 1951), but not so far in South Australia. A high proportion (84%) of the tame pigeons tested gave positive serological findings, and the isolation of virus from six of twelve birds giving such findings suggests that latent infections are common. The lower incidence of positive serological findings among the wild pigeons caught in Adelaide, and the absence of evidence of psittacosis in crested pigeons and in Indian doves<sup>1</sup> suggest that the conditions of captivity may be responsible for the high rate of infection in tame pigeons. A number of strains of virus were isolated from sparrows collected at Roseworthy. Sparrows have been suspected as a direct source of human infection (Davis, 1947), but may be more important indirectly as disseminators of infection among flocks of poultry.

## Summary.

Further evidence has been produced to show that psittacosis is common in many of the birds in South Australia which have direct or indirect contact with man.

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## Reviews.

**Transference: Its Meaning and Function in Psychoanalytic Therapy.** By Benjamin Wolstein, Ph.D., with an introduction by Clara Thompson, M.D.; 1954. New York: Grune and Stratton. 8" x 5½", pp. 220. Price: \$5.00.

IN an introduction to Benjamin Wolstein's concise and thoughtful volume, Dr. Clara Thompson points out that the author had had training in three disciplines—philosophy, clinical psychology and psychoanalysis. The book is a research into the theory of analytic therapy.

As might be expected, the name of Freud, since he was the father of psychoanalytic theory, looms large in its pages. Whilst great emphasis is laid on his undoubted genius, there

<sup>1</sup> Beech and Miles (1953) had previously failed to isolate virus from either crested pigeons or Indian doves.

is a factual discussion of the modern trends which in many ways have extended and clarified the original Freudian viewpoint. Woven into the theme is the historical approach through Freud as the hypnotist. It was the practical difficulties in this method which led to his adoption of "free association" as a means of analysis and therapy. It became apparent that the patient reacted in a childish manner to the analyst, from which observation Freud concluded that there was a reliving of the early childhood experiences with parents. There was indeed the discovery of "transference". Fenechel defines this phenomenon in the following terms: "The patient misunderstands the present in terms of the past; and, then, instead of remembering the past, he strives, without recognizing the nature of his action, to relive the past and to live it more satisfactorily than he did in childhood."

It is becoming abundantly clear that childhood attitudes are of enormous importance and set the pattern for all future activities though often unrecognizable through distortion.

The author makes it clear that the new approach to psychoanalysis has outgrown a single factor ideology in favour of a pluralistic approach. Interpersonal relationships are numerous and complex. Cultures and ethics are also plural. The result is that psychoanalysis demands a broad and pluralistic approach from the analyst. It is a difficult discipline concerning which Dr. Wolstein outlines the principles.

Transference is complex. It may be positive or negative. There are transference distortions, often indicated by gestures, body movement, altered voice and other psychosomatic manifestations which may be clearer than the verbalizations. No less than 21 situations are cited wherein the analyst is praised or blamed or the patient shows anxiety. It is the emergence of the last-mentioned which gives important clues to the type of transference.

Nor must we forget the fact of counter transference in which the analyst's own distortions can be used to advantage and must be understood.

A brief review cannot do justice to the complexity of this important subject so ably discussed by the author. This book is, however, hardly suitable for the tiro in psychoanalytic technique, but will find a welcome place on the bookshelves, as a reference book, for those who specialize in or are students of psychoanalysis.

**Clinical Psychiatry.** By W. Mayer-Gross, M.D. (Heidelberg), F.R.C.P. (London), Elliot Slater, M.A., M.D. (Cambridge), F.R.C.P. (London), D.P.M., and Martin Roth, M.D. (London), M.R.C.P. (London); 1954. London: Cassell and Company, Limited. 10" x 7½", pp. 672, with 16 illustrations. Price: 50s.

In this book the authors present a review of up-to-date knowledge on the incidence, genetics, biochemistry and pathology (including, of course, psychogenesis where applicable) of mental disorders. Mayer-Gross, sometime Professor of Psychiatry at Heidelberg, after some years at the Maudsley Institute became Director of Clinical Research at the Crichton Royal Hospital. Elliot Slater is an authority on genetics, while Martin Roth has contributed to the psychiatry of old age. The authors insist that a sound understanding of causes and accurate diagnosis must precede treatment, and the work has been planned accordingly. The book is much more factual than most text-books, and might well be regarded as an up-to-date version of Kraepelin's four volume "*Psychiatrie*", with strong emphasis on the multidimensional approach, which is discussed together with Kraepelin's and Wernicke's systems, psychobiology and psychoanalysis. The wide experience of the authors is supplemented by over a thousand references.

The scheme for case-taking is that used at the Maudsley Institute. The specialist in mental deficiency, which is dealt with in the third chapter, will need to refer to special works such as Tredgold's text-book. A lengthy section is devoted to psychopathic and neurotic reactions, perhaps the most difficult of all psychiatric syndromes to present dogmatically. The authors make no special feature of psychosomatic interrelationships which might well have been given a little more space. Hysterical multiple personalities are justly regarded as "the product of the medical attention that they arouse". Varieties of psychotherapy and their suitability for different types of patient are reviewed, though more might have been included about actual techniques. In the opinion of the authors the superficially rational appeal of psychoanalysis makes it the most effective of present-day forms of faith healing, particularly for those who are looking for some system of belief which has not been provided by religion. In the chapter on affective disorders the physical constitu-

tion with illustrations from Kretschmer and Sheldon is given some prominence. Biochemical deviations from the average are regarded by the authors as consequences of the underlying illness. Paranoia is no longer regarded as a distinct condition, but as closely linked with schizophrenia. Mental disorders in the aged are discussed at length since they constitute a growing social, economic and psychiatric problem. This section is followed by the chapter on child psychiatry. In the final chapter on administrative and legal psychiatry the legal provisions in various countries are outlined and suggestions made for reform in the British system.

The authors are to be congratulated on their "authoritative and comprehensive text book" which forms a landmark in British psychiatry and is unlikely to be superseded for a long time. Teachers of psychiatry will find it a valuable work of reference and senior students will do well to learn from it.

## Notes on Books, Current Journals and New Appliances.

**Family Doctor.** Published monthly by the proprietors, the British Medical Association, Tavistock Square, London, E.C.1. Sole agents for Australia and New Zealand: Gordon and Gotch (Australia), Limited. Subscriptions for twelve months: 20s. (sterling), including postage.

THE February issue of *Family Doctor* has quite a collection of small but none the less interesting and informative articles. Among the major articles are one by Dr. Walter C. Alvarez on heart disease, a very understanding discussion on the friends that children make and a number of brief stories by prominent men on why they became doctors. Regular features, such as cooking and answers to questions, have a prominent place. As a medical magazine for lay people this issue maintains *Family Doctor's* high reputation.

## Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"The London Medical Handbook"; 1954. London: The British and Colonial Druggist, Limited. 10" x 9", pp. 186, with three illustrations. Price: 10s. 6d.

An annual publication which is in its thirty-seventh year.

"The National Formulary"; 1955. London: The British Medical Association and the Pharmaceutical Society of Great Britain. 6½" x 4½", pp. 210. Price: 5s. (ordinary) and 8s. (interleaved).

The work of a Joint Committee consisting of 27 members comprising chiefly representatives of the British Medical Association and of the Pharmaceutical Society of Great Britain with departmental representatives.

"Kwashiorkor", by H. C. Trowell, O.B.E., M.D. (London), F.R.C.P., J. N. P. Davies, M.D. (Bristol), and R. F. A. Dean, Ph.D. (Cambridge), M.R.C.P.; 1954. London: Edward Arnold (Publishers), Limited. 9" x 6", pp. 320, with 28 illustrations. Price: 50s.

The authors are respectively clinician, pathologist and research worker.

"Handbook of Medical Treatment", edited by Milton J. Chatton, A.B., M.D., Sheldon Margen, M.A., M.D., and Henry D. Brainerd, A.B., M.D.; Fourth Edition; 1954. Los Altos, California: Lange Medical Publications. 7" x 4", pp. 576. Price: \$3.00.

The first edition was published in 1949.

"The Year Book of Radiology (1954-1955 Year Book Series)": Radiologic Diagnosis, edited by John Floyd Holt, M.D., and Fred Jenner Hodges, M.D.; Radiation Therapy, edited by Harold W. Jacox, M.D., and Morton M. Kilgerman, M.D.; 1954. Chicago: The Year Book Publishers, Incorporated. 9" x 6", pp. 432, with 348 illustrations. Price: \$3.00.

One of the Practical Medicine Series of Year Books.

"This Pace is Not Killing Us", by J. I. Rodale; 1954. Emmaus, Pennsylvania: Rodale Books, Incorporated. 8" x 5½", pp. 64, with one illustration. Price: \$1.00.

It is "inactivity" not pace which is killing us.



## The Medical Journal of Australia

SATURDAY, MARCH 19, 1955.

All articles submitted for publication in this journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those adopted by the Quarterly Cumulative Index Medicus. If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

### "THE FIRST DUTY OF MAN IS TO SPEAK."

It was Robert Louis Stevenson who said that the first duty of man was to speak. Accepting this dictum as true, we may try to qualify it with the proviso that when he speaks he should say something worth listening to. Medical folk all have something to talk about to one another—so much so that talking "shop" is the proverbial occupation of doctors. Sometimes what they say is worth while, especially if the object of their conversation is to discover why something happened, what was the process when it did happen and what the end result of that process was likely to be. It is not necessary to point out that doctors should not always talk shop, nor to remind ourselves that too much talk on one type of subject, like "all work and no play", does make Jack a dull boy. In other words and in the language of "The Preacher": "To every thing there is a season, and a time to every purpose under heaven." There is "a time to keep silence and a time to speak". Purposeful speech is that most to be desired and most admirable. Medical men and women find opportunity for such purposeful speech at congresses where there is a blending of the academic, the scientific and the practical with the social—the diverting and the festive. The ninth session of the Australasian Medical Congress (British Medical Association), to which attention has been drawn on several occasions, is being planned with great care by the President, Sir Archibald Collins, and a representative executive committee. The purpose of this reference is to urge members of the Branches to seek membership without delay. A large gathering is expected, and though Sydney is a big city accommodation will not be easily found at the last minute. The local secretaries in each State should be sought and bookings should be made. In this issue some notes on the congress appear on another page, and attention is specially drawn to the requirement

that those who wish to present papers should make their wishes known before the end of March. Inquiries should be made of the Secretaries of Sections at the Congress Office, 135 Macquarie Street, Sydney. It is hoped that the papers presented will deal with subjects that are of interest to the great body of the profession. Members will then be able to fulfil Stevenson's ideal of the duty of man in what we may call a selective fashion and in what has been described as "friendly free discussion".

### AS OTHERS SEE US.

WHEN Sir Geoffrey Vickers<sup>1</sup> spoke at the opening of the session of the University College Hospital Medical School in October of last year he made good use of his opportunity as a layman to stimulate the thinking of his medical audience. After a disarming opening comment that "everyone who has practised a profession knows what nonsense can be talked about it by people outside it", he proceeded to demonstrate that people outside the medical profession can also talk good sense about it. As a member of the National Coal Board and of the Medical Research Council Sir Geoffrey Vickers was, of course, speaking from a position of some eminence, but more important was the fact that as a member of the legal profession he could speak with professional sympathy. He suggested that his subject "Lay Attitudes to Health and Health Services", while appropriate to the present occasion, would have been even more appropriate at a school devoted to teaching laymen the art of being doctored, but unfortunately there were no such schools. However, a medical school was the next best thing, for it was chiefly from doctors that laymen learned their attitude to these things, and so he was addressing them chiefly as educators. This type of educational responsibility was, of course, common to all professional men—the relationship of professional adviser and layman was a subtle partnership, and the professional adviser, who should have the greater insight into its nature, had the greater responsibility for getting it right. Many subtle illusions had to be overcome, apart from gross illusions such as that lawyers were people who could show laymen how to flout the laws of England and that doctors could show them how to flout the laws of Nature. It was important for doctors to realize how powerful their influence was and how much the layman thought the doctor knew. The doctor was thus well placed to influence the layman's concept of health, and Sir Geoffrey Vickers thought that it was important that this should be done. He referred to the fact that we stand at the end of a period which has seen the conquest of bacterial infection and this has brought great changes in, among other things, the layman's idea of health and of disease. Nevertheless, as Vickers pointed out, most people are a long way from understanding how to live in a world in which bacteria have been in a considerable measure defeated. In this he asked for help:

We see that our medicated survival will create problems for our neighbours as well as for ourselves; and what we ought logically to be asking from you is, first, help in holding for as long as possible a high degree of health or general immunity (whichever you think the better word) to defer the onset of those ills which must ultimately kill us;

<sup>1</sup> *Lancet*, November 13, 1954.

and secondly help in bearing, and helping each other to bear, the years of disablement and degeneration with which you have endowed us by conquering pneumonia.

This is a tall order but a reasonable one, as is the corollary stated by Vickers that medical science must seek to unify our concepts of health, of therapy and of living. The proper ideal for a layman, in Vickers's words, is that "he should lead a troublefree life of health until he falls to pieces like the Irishman's gig", but in relation to this the changes that have taken place make it necessary for the layman to readjust his ideas of what he should expect of the doctor and of himself. Vickers then went on to refer to the need for a change in outlook towards preventive medicine and showed considerable perception in his description of how this has already changed. He expressed the important point that strict administrative boundaries between preventive health services and the therapeutic services were undesirable. He also referred to the growing and widening concept of rehabilitation, as it is extended to illness generally and should be used to prevent the return to hospital of patients who go out into conditions which cannot fail to undo the work done in hospital and to return them as casualties. He then went on to refer to the National Health Service. There is no need to linger here over what he had to say, as he had local conditions primarily in mind. However, we could well translate to the Australian scene his suggestion that the second educational task of the medical profession should be to evolve and spread among its patients an ethic conducive to the most efficient use of the health service.

In describing these responsibilities of the medical profession, Vickers gently but firmly insisted that they were inescapable in the present-day world and justified the point in his summing up. He repeated that the relation of doctor and patient, like that of lawyer and client, was a partnership—mutual, personal, intimate. The layman almost always had the less knowledge of what that partnership involved, and the doctor had therefore to carry the heavier responsibility in showing the layman what to expect of the doctor and of himself. That was the more needed because of present-day changes. The two partners needed different equipment for their cooperation, but they needed common assumptions, not only about what to seek and what to expect, but also about how to behave in the relevant situations. The new health service opened a new field of behaviour in which codes of conduct remained to be fully worked out. It posed no problem which was new in kind, but many which were new in degree.

In conclusion, Vickers pointed out that problems of public responsibility were not peculiar to the medical profession. Perhaps this statement is obvious, but it is not without its consolation, especially in the light of the paragraph with which Vickers concluded his address:

You are indeed lucky. Most people who, like you, carry public responsibilities must accept the mediation of administrative machinery. You still work in direct partnership with your fellow men. Moreover, you see the human scene with minds sufficiently informed to know how much of it is dark; so you will always have plenty to wonder about; and in this, too, I think you are lucky. For the practice of a profession is essentially the exercise of insight—that faculty, whatever it may be, which is of all human faculties the most delightful in its exercise and the most blessed in its result. And insight works best, perhaps only works at all, when understanding is amplified by wonder.

## Current Comment.

### RETICULOENDOTHELIOSIS.

THE term "reticuloendotheliosis", or sometimes "reticulosis", is today frequently used as a diagnosis of a set of morbid tissue alterations of macroscopic and microscopic character. Owing to the very wide variety of causes of these alterations and the varied local and general involvement of the cells of the reticuloendothelial system, Paul Klemperer raises the question whether the term should not be dropped in clinical diagnosis.<sup>1</sup> Diagnostic terms are symbols which stand for an assemblage of morbid manifestations characteristic of a disease. Reticuloendotheliosis, as a diagnostic term, aims at such definition, and Klemperer sets out to show that because of the multiplicity and uncertainty of the biological factors responsible for the proliferation of the reticuloendothelial system the term is too general and, therefore, meaningless. He discusses first the meaning of the suffix "osis". Generally this means a morbid state of an organ, or of the entire body, characterized by an undue accumulation of metabolic products or of tissue elements. It sometimes refers to a state which is neither of neoplastic nor of inflammatory nature. Does reticuloendotheliosis refer to all morbid states characterized by undue proliferation of cells belonging to the reticuloendothelial system inclusive of localized lesions, or does it imply non-inflammatory and non-neoplastic alteration of this widely dispersed cell system, characterized by its general augmentation? This ambiguity of the meaning necessitates the addition of qualifying adjectives such as "lipomelanotic reticulosis" or "benign inoculation reticulosis", the first being a general, the second a localized reactive process. The reticuloendothelial system needs to be defined. Aschoff originally identified a multitude of heterogeneous mesenchymal cells widely dispersed throughout the adult animal body, because of their common ability to store colloidal dyes in granular form. The fundamental significance of Aschoff's generalization is the thesis that apparently fully developed mesenchymal cells are still capable of further differentiation. Maximow has broadened the conception and his views are now widely supported. According to this view the ubiquitous connective tissue of the adult organism has cells which have retained their embryonic qualities of accelerated proliferation as well as developmental potentiality, and these potencies can be awakened by adequate stimulation. The main lines of differentiation of these cells are the histiocytic-macrophagic, hæmatic, endothelial and fibroblastic.

Theoretically, generalized proliferations of the reticuloendothelial system in Klemperer's view can be classified into the following groups: (a) histiocytic-macrophagic; (b) hæmatic; (c) fibroblastic; (d) endothelial; and (e) undifferentiated. Under histiocytic reticuloendotheliosis can be placed the histological alterations in typhoid fever and brucellosis, in fungal infections such as histoplasmosis, and in kala-azar. Certain types of tuberculosis also belong here. In some viral diseases such as *lymphopathia venereum* and in cat-scratch infections there is proliferation of histiocytes in regional lymph nodes, but not generalized involvement of the reticuloendothelial system. Obviously an aetiological term such as histoplasmosis is more useful than the generic term reticuloendotheliosis. Histiocytes are also reactive to metabolic disturbances. The accumulation of lipids in the Kupffer cells of the liver and the splenic reticulum cells, associated with lipæmia as it occurs in diabetes, in certain nephropathies and in xanthomatosis, reflects the ability of the reticuloendothelial system of storage, but this accumulation is not the same as the removal of colloidal substances such as dyes. It is rather a disturbance of intracellular metabolism. The association of accumulation of lipids in the histiocytes without lipæmia is seen in Gaucher's disease, Niemann-Pick disease and others. Hæmatic reticuloendotheliosis

<sup>1</sup> Bull. New York Acad. Med., July, 1954.



is associated with the large mononuclear cells of the blood. In many leuchæmias there is doubt as to the origin of the increased number of mononuclear leucocytes. Many or most undoubtedly come from the myeloblasts, but apparently there are cases of leuchæmia, in which the monocytes are of reticuloendothelial origin, and are to be regarded as leuchæmic reticuloendotheliosis. Fibroblastic potency appears, as a rule, only in pathological conditions of local distribution. The generalized spindle-cell sarcoma of lymph nodes may represent systematized fibroblastosis of the reticuloendothelial system, and the fibrous transformation of Hodgkin's disease may be similarly classified. Reticuloendotheliosis with endothelial differentiation may be seen in the hæmangiosarcoma of the spleen, in which the transformation of reticulum cells into blood sinuses can be observed. In the undifferentiated reticuloendotheliosis the proliferating cells are not differentiated as in the types already considered. One could refer to such cases as true reticuloendotheliosis. They are very difficult, if not impossible, to diagnose in life, and even at autopsy the diagnosis often remains controversial.

In view of Klemperer's contentions we may ask with him what can be gained by the use of the term "reticuloendotheliosis". By the addition of qualifying adjectives it becomes cumbersome and abstruse. There is much to be said for the retention of the eponymic designations for many of the diseases and the reservation of the term "reticuloendotheliosis" for the post-mortem diagnosis of the rare cases of generalized proliferation of undifferentiated cells of the system.

#### NUMBER AND DISTRIBUTION OF HUMAN BLOOD CELLS.

THE data are now available for assessing the total number and the distribution of the various kinds of blood cells in the human body. Using his own observations and the many published observations, E. E. Osgood<sup>1</sup> has calculated the total number of each type of cell in the body and their distribution in three compartments—the hæmatopoietic organs, the blood and neither of these sites in the standard human male of 70 kilograms weight. Physiological variations in the figures used are of the order of  $\pm 50\%$ . This does not in any way change the fundamental conclusion that seems inescapable from the data presented that leucocytes are not really blood cells.

The methods of calculation will not be considered here, but only the conclusions. When one cell, capable of division, divides, one of the resultant cells must differentiate, the other must remain immature to divide again. In the steady state the total number of cells present in the body will be the product of the number of cells capable of division and the number of divisions in one life span of the cell series.

The total number of erythrocytes in the blood-stream of a standard man is  $27 \times 10^{13}$  with a total weight of 2500 grammes. In the marrow there will be  $6 \times 10^{11}$  erythrocytes weighing 100 grammes, and there are none elsewhere.

A very different picture is seen with the various types of leucocytes. Of the neutrophile leucocytes  $18 \times 10^{11}$  or 900 grammes are in the bone marrow,  $20 \times 10^9$  or 10 grammes in the circulating blood, and  $12 \times 10^{11}$  or 600 grammes outside the blood and blood-forming organs. This distribution could easily account for the rapid appearance of these cells in the blood-stream after adrenaline or adrenocortical activity, and the accumulation of hundreds of grammes of these cells in a very short time in pneumonic consolidations, peritonitis, empyemas or abscesses. The very rapid disappearance of neutrophile cells in allergic reaction could be accounted for by an increased rate of migration out of the blood-stream.

Of the lymphocytes  $4 \times 10^{11}$  or 100 grammes are in the marrow, the same in the lymphocytic tissue and the spleen,  $12 \times 10^9$  or three grammes in the blood and  $52 \times 10^{11}$  or 1300 grammes outside the blood and blood-forming organs. Small round-cell infiltrations around capillaries in the areolar tissues are very common in microscopic sections. It is surprising that such a small percentage of the total lymphocytes should be in the blood at any moment. Of the other cells—monocytic, plasmocytic, eosinophilic, basophilic and thrombocytic series— $4 \times 10^{11}$  or 200 grammes are in the marrow, about the same in the lymphatic tissues,  $2 \times 10^9$  or one gramme in the blood and  $8 \times 10^{11}$  or 400 grammes in other tissues. These cells are well known to be widely spread in body tissues generally, particularly in areolar tissue. These observations would account for the rapid disappearance of leucocytes from the blood-stream after massive transfusions of leucocytes or in parabiosis and make it unnecessary to postulate short life spans. They would also account for the relatively large number of these cells which are lost from the body each day into the gastrointestinal tract.

The leucocytes in the blood-stream must be regarded as *en route* to another destination and not primarily as blood cells. Only 1/40 to 1/400 of the total leucocytes outside the hæmatopoietic organs are present in the blood-stream at any moment. Where are the remaining leucocytes? Available evidence suggests that large numbers of these are present in the lungs. This is the largest capillary bed in the body, and the only one through which the entire blood volume passes in any one circulation. The lungs could then be an ideal storage place. It would seem reasonable to postulate that the leucocytes constitute a mobile army constantly shifting to the sites where they are needed most, and that the number of leucocytes will vary greatly in different locations. Individual cells may enter the blood-stream several times in their true life span.

#### AN UNUSUAL CASE OF COMA.

WHEN a patient in coma is admitted to hospital, as a general rule there is some indication of what has brought him to that pass. F. Layani and J.-P. Benhamou<sup>1</sup> report a case in which the cause of the coma was shrouded in mystery. The patient, a taxi-driver, aged seventy years, was admitted to the *Hôtel-Dieu* with the diagnosis of uræmic coma. He had always been healthy until two days previously, when he suddenly began to suffer from severe pain in the right side of the abdomen; the pain came in paroxysms, but did not radiate in any direction. A physician and surgeon diagnosed renal colic. Atropine and aspirin were prescribed, together with "Optalidon" suppositories. The patient's pain was relieved, but in the afternoon of the next day he seemed less alert and less inclined to talk. During the night he lapsed into unmistakable coma. On his admission to hospital every possible investigation was undertaken. Although the coma was deep, he seemed to react slightly to painful stimuli, and in particular to palpation of the right side of the abdomen in the lumbar region and the hypochondrium. A few slightly crepitant râles were heard in the bases of both lungs. The blood pressure was very low (which occasioned surprise), but the heart sounds were clear and the pulse rate was regular (72 beats per minute). The respirations were regular and the temperature was  $98.2^\circ \text{F}$ . The deep reflexes were present but weak, Babinski's sign was absent, Kernig's sign could not be elicited, and the optic fundi were normal. There were no localizing signs at all to explain the sudden coma; the patient presented a nice problem in diagnosis.

The idea of a specifically neurological cause was considered only to be at once discarded, in the absence of any evidence of a cerebral or meningeal lesion. Coma due to cardio-vascular collapse was entertained, but ruled out,

<sup>1</sup> *Blood*, December, 1954.

<sup>1</sup> *Presse méd.*, December 11, 1954.

The most probable cause was held to be toxic; the coma might have been diabetic or uræmic. There were no indications of diabetes, and a catheter specimen of urine contained no sugar; careful evaluation of the clinical history and findings eliminated uræmia; but barbiturate poisoning fitted well with all the data. It was suggested to the family that the patient might have taken phenobarbital with suicidal intent; the reply was that in that case he would have had to have some phenobarbital, and there was none in the house. Once more the drugs given to the patient to relieve his pain were considered; suspicion rested alone on the suppositories. Their exact composition was investigated and was found to be as follows: caffeine, 0.375 gramme; "Pyramidon" (amidopyrine), 0.375 gramme; "Soneryl" (butobarbital), 0.15 gramme. At this stage the family volunteered the information that a suppository had been inserted in the patient's rectum every three hours. When the fifth was inserted, he complained of extreme drowsiness and fatigue. The treatment, far from being restrained by these indications, was pursued *"avec vigueur et ténacité"*, all through the night in spite of the onset of coma. A ninth suppository was inserted just before the patient was taken to hospital. He had therefore received 1.35 grammes of butobarbital in twenty-four hours. Butobarbital is held to be only half as strong as phenobarbital. Thus the diagnosis of coma due to barbiturate intoxication was confirmed. The high degree of arterial hypotension probably owed something to the large doses of amidopyrine (3.375 grammes) that the patient had received. Treatment with antibiotics and an adequate amount of fluid was instituted, and recovery from the coma proceeded uneventfully. Investigation of the patient failed to reveal the cause of the attack of pain that had set such active treatment in train; *"une chose était sûre: la thérapeutique avait fait disparaître les douleurs"*.

Layani and Benhamou comment that this case shows how mysterious some toxic comas can be; it also shows how dangerous some drugs in ordinary use can be in excessive dosage, especially when the patient is aged. The authors also stress this further evidence of the efficiency of the rectal administration of drugs. There is a further moral that might be stated: it would surely be a wise precaution, when a patient's family has the responsibility of administering strong drugs, to give accurate and clear instructions as to how, and how often, they should be administered.

### PREFRONTAL ULTRASONIC IRRADIATION LOBOTOMY.

ALTHOUGH certain controversial aspects of the subject remain, prefrontal lobotomy has settled down to a reasonably defined place in the treatment of certain psychiatric conditions, and it is perhaps more widely accepted as an aid in the management of intractable pain associated, for example, with advanced malignant disease. However, no one would regard even the best of the present forms of surgical operation as ideal, and improvements in technique are always to be desired. A recent report by P. A. Lindstrom<sup>1</sup> describes an attempt to get away altogether from the ordinary form of surgical mutilation and to achieve comparable results with high frequency sound waves. The work described, which follows on that of a number of other investigators, involved first of all animal experiment and then studies involving 20 patients. Seventeen of these had intractable pain, two had severe mental symptoms associated with advanced organic disease, and one had severe uncontrolled epilepsy. All patients with malignant lesions had received maximum therapy in the form of surgery, X-ray irradiation, radioactive isotopes, cortisone and other medication. Those with severe pain had been receiving large doses of opiates or other strong analgesics for long periods with little relief. The ultrasound was applied through trephine

holes over the frontal areas, mostly with only local anaesthesia. No post-operative complications occurred. All electroencephalograms were normal. No inertia, stupor, incontinence or obvious personality changes followed the ultrasonic irradiation. The patients retained their insight and judgement as far as could be estimated, and after their suffering was controlled or lessened they took more interest in their surroundings and showed more initiative. Several were able to go home. Of the 17 patients suffering from excruciating pain, ten had practically complete relief during periods of observation which varied from two weeks to eleven months. Within one to three days after the irradiation most of the patients ceased to ask for narcotic drugs or suggested that administration of the drugs should be discontinued. All appeared more relaxed, and some seemed slightly euphoric. A few had return of pain, but it was then bearable, usually temporary, and often different in type and location. Four other patients with intractable pain showed improvement, in that the excruciating and persistent suffering they had experienced decreased after the prefrontal irradiation. Intermittent moderate pain continued, but the patients were certainly better off. The remaining three of the seventeen patients with intractable pain continued their complaints after the treatment. In one of these cases narcotic addiction was apparently a large factor in the persistence of the complaints, but after a third treatment with irradiation the patient became fairly comfortable. The second patient had a short period of pain relief, but a depressed state progressed with spread of malignant disease, and the patient died within four weeks. In the third case the treatment was an obvious failure. As might be expected in such cases, an opportunity to examine the effects of the ultrasonic irradiation on the brain tissue fairly soon presented itself with the death of the patients from their malignant conditions. Fourteen complete post-mortem examinations were carried out. It was found that the histological damage in the path of the sound beam was localized mainly to the white matter. A satisfactory lobotomy effect was obtained in most cases in spite of the fact that the tissue alterations were minimal. It is apparent that the ultrasonic damage can be controlled and graded from a reversible or minimal effect to gross necrosis in the subcortex without opening the dura.

In evaluating the clinical results and the possible extension of the technique to patients with mental disorders, Lindstrom points out that the various lobotomy operations are the same in principle and are performed in the same manner whether they are intended for the relief of mental symptoms or for control of pain. If a certain form of lobotomy is of value for intractable pain and anxiety, it is found also to be of value for the types of psychoses that usually respond to psychosurgery. From experience so far gained and with adjustment of technique it is proposed to extend the treatment to this second group of cases. Referring to the relief of suffering among cancer patients from therapeutic damage of prefrontal tissue by any technique, Lindstrom states that one should not expect too much. Practically no patient who remains rational while falling because of a spreading malignant neoplasm will be comfortable until his death, no matter how "successful" the treatment of pain has been. Various other distressing physical symptoms and all the things that remind the patient of the steady progress of his illness will continue to disturb him to some degree after any form of lobotomy if he retains good insight and judgement. Lindstrom defines "improvement" in these patients with metastases as the relief of severe constant pain, the lessening of emotional tension, fears and worries, and great reduction or elimination of need for narcotics. He states that the impression of the several observers who followed the patients in this series is that the results compare favourably with those obtained with surgical lobotomy in similar cases. All observers have noted the lack of side effects.

One real advantage of the method appears to be that the therapeutic damage can be controlled. Lindstrom suggests that in some respects one can compare this ultrasonic treatment with cerebral concussion limited to part of the prefrontal lobes. On the basis of further clinical

<sup>1</sup> Arch. Neurol. & Psychiat., October, 1954.



and pathological data it should be possible to predict with some degree of accuracy whether the effect of a certain ultrasonic irradiation will last only for days or will persist for many months or will become permanent. If this prediction became possible, the treatment could then be used in a preliminary test, the procedure could be repeated with increased sound energy if this was indicated, and more lasting results could be obtained when desired. Lindstrom points out that a number of patients, even among carefully selected groups, will show no improvement in mental symptoms or relief of pain from a lobotomy, regardless of the extent of coagulation or cutting, and unfortunately the symptomatic improvement in the individual case cannot at present be predicted. However, the patient and his relatives can be assured that the chances of complications or of accentuation of symptoms are minimal with ultrasonic treatment, since the therapeutic damage is controlled and unintentional mutilation can be avoided.

#### "VITAMINS P" AS POSSIBLE THERAPEUTIC AGENTS IN RESPIRATORY INFECTIONS.

MANY substances have been shown to have "vitamin P" activity, as tested by observations on capillary fragility in guinea-pigs deficient in "vitamins P". All are phenylbenzo-Y-compounds (flavonoids). They occur in natural products usually closely associated with ascorbic acid. For instance, lemons, oranges and black currants are excellent sources of "vitamins P".

There is some doubt whether or not "vitamins P" are dietary essentials for man or animals. It has been shown by C. E. Zacho,<sup>1</sup> A. L. Bacharach, M. E. Coates and T. R. Middleton<sup>2</sup> and others that in guinea-pigs maintained on scorbutogenic diets supplemented with adequate ascorbic acid, there is an increase in capillary fragility. However, capillary resistance returns to normal when preparations containing "vitamins P" are given. Capillary fragility is measured by observing the hæmatoma formed as a result of small petechial hæmorrhages which develop after the application of a standard suction cup to the skin for a standard period. The large hæmatomata and bleeding gums which are characteristic of frank scurvy appear to be quite independent of capillary fragility and should not be confused with it. It has been found that "vitamins P" do not modify the course of clinical scurvy either in the human or in the guinea-pig. In the case of the guinea-pig, it has been found possible to produce clinical scurvy in animals with a high capillary resistance by feeding diets deficient in ascorbic acid but supplemented with a "vitamin P" preparation.

An experimentally produced clinical syndrome of "vitamin P" deficiency in two elderly men was reported by Scarborough in 1940. These men were admitted to hospital with multiple vitamin deficiencies and were treated for four months with a diet which excluded "vitamins P". No confirmation of this work has yet been reported. A number of authors have reported that preparations of "vitamins P" will elevate capillary resistance in many humans where it is found to be lowered. However, it should be emphasized that there is no conclusive evidence that persons or animals with increased capillary fragility suffer any disadvantages. For this reason, "vitamin P" is not regarded as an essential vitamin but rather as a pharmacological substance.

Recently, M. S. Biskind and W. C. Martin<sup>3</sup> made a preliminary report of a series of 22 cases of respiratory infections in which the patients were given large doses of "vitamins P" as citrus flavonoids (a commercial extract of citrus fruit), in which they observed a dramatic remission of symptoms in 20 cases. The patients, whose ages ranged from seven to seventy years, suffered from conditions such

as simple rhinitis without pyrexia to acute tonsillitis and influenza, with fever to 102° F. The optimum dose appeared to be two capsules, each containing 100 milligrammes of citrus flavonoids plus 100 milligrammes of ascorbic acid, given three times daily. The authors observed that recovery occurred in from eight to forty-eight hours. The flavonoids appeared to be effective no matter at what stage of the infection the treatment was started. The watery secretions so characteristic of respiratory-infections thickened within a few hours and sometimes caused temporary difficulty in nasal breathing. It was suggested by the authors that the flavonoids might operate by decreasing capillary fragility. However, there is no mention of tests of capillary resistance having been made during the course of these trials. Biskind and Martin realize that the series of cases is small, but they were so impressed by the apparently dramatic effects that they have published the preliminary report so that others may test the possible value of the treatment.

There can be no doubt that "vitamins P" have a demonstrable effect on capillaries. Should the preliminary report of Biskind and Martin receive confirmation, it may not be long before "vitamins P" are elevated to the status of essential vitamins. Meanwhile, we are reminded that our knowledge of dietary factors is far from complete and that natural products are the best sources of the known vitamins. For lack of information, it is difficult to compare the doses of citrus flavonoids used by Biskind and Martin with amounts which could be expected to be supplied by raw fruit juices. It is just possible that the homely treatment of coryza by means of hot lemon drinks may not be empirical.

#### THE FORTIETH BIRTHDAY OF THE AUSTRALIAN RED CROSS SOCIETY.

On August 13, 1954, the Australian Red Cross Society celebrated its fortieth birthday. Since its formation, on the outbreak of World War I, Red Cross has made for itself an important and valued position in Australian life. No Australian needs to be reminded of the activities of Red Cross in time of war. The peace-time work of the Society, however, often goes unnoticed. But it goes on just the same. Red Cross still maintains its Field Force working for the Australian troops in Korea. It has workers helping to alleviate suffering and distress in Malaya and Indo-China. The Tracing Bureau of the Red Cross, which attempts to locate prisoners-of-war, continues its valuable work in peace, reuniting families displaced by war.

The work of the Red Cross Convalescent Homes for ex-servicemen is well known and must continue. In peace this work also extends to the care of aged ex-servicemen, and in almost every State of the Commonwealth some activity is undertaken on behalf of crippled children. A variety of services is provided for mothers and families. In Queensland the Society runs an "Aid to Mothers" housekeeper service. In South Australia Red Cross organizes a human milk bank and provides special bassinets. Other forms of community service include hospital visiting, "Meals on Wheels" services, the Victorian "Insulin Run", hospital library services, aid in immunization depots, baby health centres and mass radiography campaigns. Probably the best known service of Red Cross in Australia is the National Blood Transfusion Service which has saved thousands of lives of both servicemen and civilians. Through this service blood and serum are supplied free of charge to any person who may need them. To maintain its stocks the Red Cross constantly needs more blood donors. Every man or woman who is over eighteen and under fifty-five years of age and is in reasonably good health can be a blood donor.

To continue its work in all these spheres the Australian Red Cross needs active support, and the medical profession is in a position to give it.

<sup>1</sup> *Acta path. et microbiol. scandinav.* (1939), 16: 144.

<sup>2</sup> *Biochem. J.* (1942), 36: 407.

<sup>3</sup> *Am. J. Digest. Dis.* (1954), 21: 177.

## Abstracts from Medical Literature.

### SURGERY.

#### Diaphragmatic Hernia.

R. T. GANTS (*Ann. Surg.*, February, 1954) states that diaphragmatic hernia is no longer a rare condition. Improvement in the technique of X-ray examination and a clearer understanding of the symptomatology of this disorder have led to its being encountered not infrequently in all age groups. The author follows Harrington's classification: non-traumatic and traumatic. Under non-traumatic, there is a subdivision, congenital, which includes (i) through the pleuro-peritoneal canal (foramen of Bochdalek), (ii) through a gap left by partial absence of the diaphragm (usually the posterior portion), (iii) through the oesophageal hiatus (the result of muscular deficiency), (iv) through the oesophageal hiatus (the result of a congenitally short oesophagus), and (v) through the anterior subcostal spaces (foramen of Morgagni). The second subdivision of non-traumatic comprises hernia acquired after birth: (i) through the oesophageal hiatus (this usually has a hernial sac), (ii) through the region of fusion of the *Anlage* of the diaphragm, and (iii) at sites named under congenital hernia. Traumatic hernia may be due to (i) direct injury, such as by a missile, (ii) indirect injury, usually at points of embryological fusion, or (iii) rupture of the diaphragm due to inflammatory necrosis. The author points out that not only is thoracic stomach a very rare congenital anomaly, but it is not a true herniation, as the stomach was never in the abdomen to herniate through the diaphragm. Eversion of the diaphragm is not included, as is an abnormally high position of one leaf of the intact diaphragm as a result of paralysis, aplasia or atrophy. The sliding type of hiatal hernia is fourteen times more common than the rolling or para-oesophageal type. The main point of differentiation between the sliding and para-oesophageal types of hiatal hernia is that in the sliding type the cardiac sphincter or cardia is patulous, favouring reflux of gastric juice, because of its position above the diaphragm; whereas in the para-oesophageal type the cardia remains below the diaphragm and is not patulous. The author discusses the symptomatology and the treatment of the different types of hernia and gives details of ten cases.

#### Carcinoma of the Oral Cavity.

J. D. BRIGGS (*Western J. Surg.*, July, 1954) discusses the salient features in patients presenting with carcinoma of the oral cavity. All patients were male. The youngest patient was thirty-eight years of age and the oldest seventy-eight years; the majority were between fifty and sixty years of age. The symptoms first noted by 48 patients were pain, bleeding or the presence of a tumour. Two patients were unaware of the primary lesion and sought treatment for a mass in the neck. Only three patients

were non-smokers. Seven of the ten patients with carcinoma of the alveolar ridge were edentulous. Nineteen patients had palpably enlarged cervical nodes. The parts involved in the primary lesion were the palate (eight cases), alveolar ridge (15 cases), tonsil (69 cases), floor of the mouth (91 cases), buccal mucosa (30 cases) and tongue (164 cases). Sixty-seven surgical procedures were performed in the treatment of 50 patients with intraoral carcinoma at Wadsworth Hospital. Thirty-six operations were directed at the primary lesion and eight at cervical nodes; 23 consisted of removal of the primary tumour and cervical nodes in continuity. No serious operative complications were encountered. Three patients who had combined procedures died in the immediate post-operative period. The author states that 43% of the patients treated by local excision had recurrence of the lesion; 75% of those treated by local excision and neck dissection as separate procedures developed further tumour. Only 25% of those who had a combined procedure developed recurrence.

#### Histoplasmosis.

D. N. VIVIAN, L. A. WEED, J. R. McDONALD, O. T. CLAGETT AND C. H. HODGSON (*Surg., Gynec. & Obst.*, July, 1954) present a review of the clinical and pathological characteristics of histoplasmosis as observed in all cases of this disease encountered at the Mayo Clinic. There were 20 such cases, the diagnosis being proven by culture in all but one of the cases. This case was accepted into the series because the pathological and clinical picture was consistent with that of histoplasmosis as a granulomatous disease caused by the fungus *Histoplasma capsulatum*. The life cycle was studied in 1941 by Carant, who found that the cycle of life could be completed only by passing the mycelial form through animals. He placed the fungus in the group Moniliaceae, of the Fungi Imperfecti. The granuloma which this fungus produces is a small collection of epithelioid cells, intermixed with foreign body giant cells and surrounded by small mononuclear cells resembling lymphocytes. The lesion greatly resembles that produced by tuberculosis, coccidioidomycosis, brucellosis, sporotrichosis, kala-azar and sarcoidosis, and there is nothing pathognomonic on microscopic section to differentiate them unless organisms are visible. Bacteriological isolation of the organisms is the only means of proving definitely that an infection is present. The fungus is fully described, and the stains recommended are the Giemsa and the Best-Bodian. The disease may cause large abscesses or only small miliary nodules. The ages of patients ranged from seven months to seventy-four years, and most came from the central states around the Mississippi River. In this series 11 deaths had occurred at the last report. The clinical manifestations may be quite variable. The disease may simulate tuberculosis in particular—so much so, in fact, that patients who present symptoms of pulmonary or even generalized tuberculosis but from whom tubercle bacilli cannot be isolated should undergo careful additional investigation by bacteriological studies in

an effort to isolate *Histoplasma capsulatum*. Histoplasmosis is a protean disease. It may be localized or generalized, and it may imitate any other granulomatous disease. The histoplasmin skin test has not proved useful in differential diagnosis. The mode of transmission is unknown, and the route of entry of the fungus is not definitely established. Circumstantial evidence strongly suggests the respiratory and digestive tracts as routes of entry. Many patients who have this disease will die of it because there is no satisfactory specific therapy. Patients with isolated pulmonary lesions have an excellent chance of cure by surgical treatment. Involvement of the adrenal glands occurs frequently in generalized histoplasmosis, and this may be the aetiological basis for some cases of Addison's disease. If on microscopic section spherical or oval encapsulated organisms two to five microns in diameter are seen in the cytoplasm of macrophages in a granulomatous lesion and the patient has not been in tropical areas, for all practical purposes a diagnosis of histoplasmosis may be made, regardless of whether or not a positive culture result has been obtained.

#### Obstructive Jaundice in Infancy.

E. M. GREANEY, W. H. SNYDER, JUNIOR, AND L. CHAFFIN (*Am. J. Surg.*, July, 1954) report that 33 infants with a diagnosis of obstructive jaundice were investigated surgically over an eighteen-year period at the Los Angeles Children's Hospital. Roughly one-third of these infants had surgically remediable lesions, one-third had normal extrahepatic biliary systems, and one-third had anomalies not amenable to present surgical techniques. Of the eleven infants who had normal extrahepatic biliary systems, seven are dead, presumably from intrahepatic biliary atresia. The authors state that an infant with progressive unremitting jaundice with acholic stools should have a thorough investigation to exclude any medical causes. If these cannot be found, surgery is performed. A transverse incision is used with wide exposure. While the patient is on the operating table cholangiography is carried out when feasible, and complete dissection of the portal triad is performed before defeat is admitted. The authors urge that in such cases surgery be resorted to early—at the age of about four weeks—rather than two months later, before the patient's condition has advanced to biliary cirrhosis, which well may be irreversible.

#### Hermaphrodites and the Skin Biopsy Test of Chromosomal Sex.

M. L. BARR (*Surg., Gynec. & Obst.*, August, 1954) presents an interim report of the results of the skin biopsy test of chromosomal sex in 29 cases of hermaphroditism. He states that in previous reports he and his co-workers have shown that there is a difference in nuclear structure, according to sex, in cells of many species, including man. Intermitotic nuclei of females contain a special mass of chromatin, the sex chromatin, which is encountered rarely in males. Of the total of 29 patients, the epidermal nuclei were similar to those of normal females in 16, and similar to those of



normal males in 13. The relation between nuclear morphology and clinical diagnosis is as follows: (a) four true hermaphrodites, three with female type nuclei and one with male type nuclei; (b) 14 female pseudohermaphrodites, 12 belonging to the adreno-genital syndrome group and with female type nuclei, and two not belonging to the adreno-genital syndrome group, one with female type nuclei and one with male type nuclei; (c) 11 male pseudohermaphrodites, all with male type nuclei. The classification the author uses is that of Klebs, which is based primarily on the nature of the gonads. True hermaphrodites have both ovarian and testicular tissue. In male pseudohermaphrodites the gonads are testes; in female pseudohermaphrodites the gonads are ovaries. This preliminary study indicates that the skin biopsy test is a useful aid in the differential diagnosis between the congenital adreno-genital syndrome and male pseudohermaphroditism when the clinical findings are equivocal.

#### Abdominal Actinomycosis.

G. ARMITAGE AND I. SMITH (*Brit. J. Surg.*, July, 1954) present a case report of a patient, aged fifty-nine years, with actinomycosis in the left side of the abdomen infiltrating the abdominal wall. The patient recovered and resumed work after being treated with 120 mega units of penicillin over sixty days. The authors state that the condition is uncommon in Great Britain, as in fifteen years from a population of 500,000 to 750,000 only nine cases of abdominal actinomycosis were met with at hospital. Actinomycosis develops in the abdomen when a breach of the bowel caused by other disease, such as acute appendicitis, peptic ulcer, diverticulitis or injury, allows the escape of *Actinomyces israelii* into tissue spaces. The fungus may be found in teeth scrapings, faeces or even bronchoscopic suction material of healthy subjects. In three cases reviewed the patients received no antibiotics or very small doses, and two of them died. Five patients were treated with penicillin and one with penicillin and streptomycin. It is concluded that penicillin in large doses is commonly curative. When it fails, "Terramycin", chloramphenicol, "Aureomycin" and streptomycin may prove effective in that order of likelihood.

#### The Function of the Clavicle.

L. ABBOTT AND D. LUCAS (*Ann. Surg.*, October, 1954) state that after analysing the function of the clavicle in the shoulder joint mechanism, they believe that the clavicle is a surplus part, which can be totally excised without functional disturbance. They base this statement on a series of cases in which the clavicle was excised for various reasons without any attempt being made to replace the removed bone. They point out that when attempts are made to replace the defect in the clavicle, both non-union with pain and malunion with deformity were common, resulting in disturbed function.

#### Neuroblastoma and Wilms Tumour in Infants and Children.

C. KRUSE, W. SNYDER AND L. CHAFFIN (*West. J. Surg.*, October, 1954) discuss 63 cases of Wilms tumour and 48 of

neuroblastoma, occurring in children. They point out that bone marrow aspiration is a valuable help in the study of such cases, in that the finding of malignant cells in the marrow, not always revealed by radiographic studies, may prevent unnecessary surgery and influence prognosis. Treatment where possible was by nephrectomy, adrenalectomy and removal of the perirenal fascia via the abdominal approach, followed by irradiation therapy. In this series, in the Wilms tumour cases in which surgery was performed, there was a 30% three-year survival rate, the average age of the survivors at operation being forty months. Similarly, patients with a neuroblastoma had a three-year survival rate of only 11%.

#### A Simple Method of Inducing Hypothermia.

B. BLADES AND H. PIERPONT (*Ann. Surg.*, October, 1954) state that hypothermia is dangerous in the human because of induction of ventricular fibrillation as a result of tissue anoxia due to decreased oxygen dissociation from the blood-stream to the heart tissues. They have induced efficient hypothermia by direct cooling of the circulating blood, allowing cold physiological saline to bathe the pulmonary vascular bed of the lung, the aorta and the pleura. By this method, hypothermia can be reversed quickly if signs of ventricular fibrillation due to myocardial anoxia are detected early by the electrocardiograph.

#### Bilateral Adrenalectomy for Advanced Carcinoma of the Breast.

M. GALANTE, J. RICHES, P. FIERSHAM, D. WOOD AND G. BELL (*Ann. Surg.*, October, 1954) state, on the basis of an experience with 31 patients, that, in patients who have failed to respond to established methods of therapy, bilateral oophorectomy and adrenalectomy appear to offer an additional therapeutic step. In their series 45% of patients showed subjective improvement, but only 22% objective. However, the arrest of metastatic spread was only transitory. Primitive carcinomata responded as well as more differentiated forms. A method of demonstrating inactivation of the adrenal oestrogens by the liver with no significant inactivation of hydrocortisone is shown in a case in which the right suprarenal only was removed, whereas the left was left *in situ* but its vein was anastomosed to the splenic vein.

#### Characteristics of Adrenal-Dependent Mammary Cancers.

C. HUGGINS AND T. DAO (*Ann. Surg.*, October, 1954) state that in a series of 100 women with far advanced mammary carcinoma treated by adrenalectomy, with or without oophorectomy, the post-operative mortality was 5%. Regressions of varying duration occurred in 38 cases; in some profound regression persisted for more than three years. The best response occurred in patients over forty years of age with a prolonged interval between radical mastectomy and onset of metastases, in which the primary lesion showed the histological picture of adenocarcinoma with well formed acini, and in whose urine there was a high titre of

oestrogenic substances. In this series, patients with duct carcinoma seldom responded to adrenalectomy, and patients whose original tumour was an indifferent carcinoma never responded.

#### Traumatic Arterial Spasm and Thrombosis.

W. EDWARDS AND C. LYONS (*Ann. Surg.*, September, 1954) discuss the problem of vascular surgery without laceration of the vessel. They state that blunt trauma, especially accompanied by fracture, is occasionally complicated by arterial spasm or thrombosis. Up till recently conservative treatment only was used in such injuries in the region of, for instance, the elbow or knee, in which the peripheral pulse was greatly diminished or absent. The authors conclude, on the basis of their experience, that when such a condition occurs, the injured artery should be explored as quickly as possible if brachial block or spinal anaesthesia does not cause a return of pulsation in a few minutes. The perivascular sheath should be widely opened and any haematoma evacuated. If spasm is present, local treatment with papaverine is used; but if it persists, the affected segment should be resected and grafting carried out. If the vessel is contused or thrombosed, this warrants a primary resection of the affected area with replacement by graft. A saphenous vein graft should be used in areas where muscular support is present, and arterial homografts in unsupported areas. The authors point out that sympathectomy is of no avail in these arterial lesions.

#### Acute Peptic Ulceration as a Complication of Major Surgery, Stress or Trauma.

D. FLETCHER AND H. HARKINS (*Surgery*, August, 1954) found acute peptic ulceration present in 42 of 4102 autopsies following death due to acute illness. They point out that this complication can occur in a number of primary conditions, including major surgery, stress or trauma, and not only in burns as was originally thought. They conclude that as the nature of these primary conditions includes an element of stress, a possible mechanism of this ulcer production involves the action of an adrenal cortical hormone on the stomach increasing gastric secretion.

#### Fat Embolism.

L. PELTIER (*Surgery*, August, 1954) states that in a group of 78 patients undergoing various orthopaedic procedures, fat emboli were found in 43. There was good correlation between the extent of bony injury and the presence of embolic fat, especially after reconstructive bone operations. The frequency of this finding and the absence of clinical signs suggested to the author that traumatic lipemia was a normal sequel to bony injury and became of pathological significance only when other as yet unknown factors came into play. The author has developed a method for detecting fat emboli in circulating blood depending on the concentration of the emboli by centrifugation and their visualization by fluorescence microscopy after staining with a water-soluble fluorochrome, phosphin 3R.

## British Medical Association News.

### SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on October 30, 1954, at the Tamworth Base Hospital, Tamworth, Dr. T. Y. NELSON, the President, in the chair.

#### Intravenous Fluid Therapy and Electrolyte Balance.

DR. C. R. B. BLACKBURN discussed intravenous fluid therapy and electrolyte balance. He introduced the subject by reviewing briefly some of the more important features of the chemical anatomy and physiology of fluids and electrolytes in the human body. He pointed out that an appreciation of the physiological alterations in disease states made the management of patients easier.

Dr. Blackburn went on to describe the size and composition of the various fluid and electrolyte compartments on the basis of Gamble's well-known diagram, and gave appropriate figures for normal persons both as totals and as milliequivalents or millilitres per kilogram of body weight. He laid stress on the presence of chloride in the extracellular fluid as distinct from the intracellular fluid, and on the importance of the extracellular fluid concentration of potassium in spite of the fact that it was low compared with the concentration in the intracellular fluid. He said that although half of the body content of sodium was present in the intracellular compartment (including bone), sodium must be regarded primarily as occurring in the extracellular fluid compartment, where it played a major role in the maintenance of osmolarity.

Dr. Blackburn discussed a slide showing the composition of normal intestinal secretions and their volumes with especial reference to pH and to the presence of potassium in concentrations equal to or greater than those found in extracellular fluid. The volume of intestinal secretions, excluding saliva, was stated to amount to some seven litres per day. Dr. Blackburn then showed a slide illustrating a normal daily balance of water, sodium, chloride and potassium, in which the volume of water in insensible perspiration and stools amounted to one litre and of water of oxidation to 250 millilitres. It was pointed out that the presence of diarrhoea or of a raised body or environmental temperature made an enormous difference to the overall balance. It was virtually impossible to determine the daily sweat loss without daily weighing, and the determination of the amount of chloride, sodium and potassium loss by that route was still more difficult; rules of thumb had to be used. The importance of adequate renal function was discussed, particularly with regard to the need for an adequate volume of urine, both in terms of the load of solids presented for excretion at the glomeruli and in terms of the concentrating power of the renal tubules.

Dr. Blackburn described certain interrelationships and placed the chief emphasis on the exchange between extracellular potassium and intracellular hydrogen ion and sodium. He also stressed the importance of this interrelationship in the development of potassium deficiency alkalosis. In regard to the movement of potassium into cells he mentioned the influence of the conversion of glucose into glycogen and discussed the therapeutic implications. He described the mechanisms of acidification of the urine and the reciprocal relationship between potassium and hydrogen ion exchange with sodium and made reference to the effects of impaired renal function on patients with renal disease. He pointed out that the failure to form ammonia, to secrete hydrogen ion and to secrete potassium tended to induce acidosis beyond that induced by anion retention.

After making some comments on controlling mechanisms, Dr. Blackburn referred to the overall effect of steroids in causing sodium retention, especially in patients in the post-operative stage, to the action of pituitary antidiuretic hormone and to the interrelations of osmotic and volume effects.

Dr. Blackburn then described some of the changes occurring in patients deprived of food and water: obligatory water losses, loss of water from the intracellular and extracellular fluid compartments, loss of potassium from cells, decreased plasma volume and altered renal function, the development of ketosis, and finally the metabolic changes when attempts were made to correct dehydration and metabolic acidosis by the administration of "glucose-saline". The importance of potassium in this regard was emphasized.

The changes in "cell injury" were described with particular reference to the increased water content of cells and the replacement of intracellular potassium by sodium.

Dr. Blackburn laid down the following main principles of management: (i) Know what must be happening to the patient. (ii) Give the patient what he needs, when he needs it and how he needs it. (iii) Give water, electrolytes and calories.

He pointed out that the analysis of data obtained by (i) a careful history, (ii) repeated observations of the patient and his response to treatment, and (iii) an accurate record of input and output of fluids, calories and electrolytes made it possible to give the patient appropriate volumes of water, milliequivalents of electrolytes, numbers of calories and grammes of haemoglobin. Each patient was assessed in terms of his or her individual metabolic needs and in terms of cardio-vascular and renal functional status. The oral route was the preferred route for fluids, calories and electrolytes.

Commenting on the best means of giving water, calories and electrolytes with special reference to readily available solutions, Dr. Blackburn said that it was most important not to give potassium intravenously unless there was adequate renal function or unless one knew the level of serum potassium; furthermore potassium solutions should not be given at a rate faster than 10 milliequivalents per hour—in other words 300 millilitres of Darrow's solution per hour.

Dr. Blackburn then outlined the nature of the disorders of homeostasis which occurred in common conditions. He pointed out in regard to surgical patients that there was regularly post-operative sodium and chloride retention, and therefore routine "salines" were contraindicated.

The changes in patients with intestinal obstruction at various levels were described and illustrated by slides showing the measured quantities of water and electrolytes which had been lost by patients with intestinal obstruction and various fistulae. The principles of management of these disorders were illustrated by reference to case histories.

In a reference to the management of burns Dr. Blackburn favoured the proposals outlined by Bull, of Birmingham.

Going on to discuss renal insufficiency and anuria, Dr. Blackburn emphasized the importance of assessing renal function, by simple means, in all patients with disorders of fluids and electrolytes. He recommended the management of anuria along conservative lines and illustrated the value of a suitably placed Miller-Abbott tube by brief case reports. Some comments were made on patients with diarrhoea and other conditions.

In concluding, Dr. Blackburn stressed the fact that biochemical determinations carried out on patients with disorders of fluid and electrolytes were of great value, but said that a sound knowledge of the basic physiology was essential for the recognition and treatment of disorders of fluids and electrolytes that arose in practice. It was most important to assess renal function before embarking on therapy. Solutions for intravenous administration should be thought of in terms of their fluid and electrolyte content and not as "saline" or "glucose" *et cetera*. No solution should be given by vein unless other safer and more physiological routes were unavailable; fluids should be given by mouth if possible.

Dr. R. T. FINCH said that he had been interested in Dr. Blackburn's remarks about the Fantus test, and he had three questions to ask. In the first place, Dr. Finch asked Dr. Blackburn to give his opinion of the reliability of the test, and to say how it was carried out, and who carried it out, the nurses or the resident medical officers. Secondly, Dr. Finch said that he had been interested to hear Dr. Blackburn recommend the taking of electrocardiograms in early hypopotassemia; he wondered why this was preferred to serum potassium estimations. Finally, Dr. Finch referred to Dr. Blackburn's comments on the treatment of burns by the transfusion of plasma. He said that the subject had been a controversial one for a number of years, and he asked Dr. Blackburn if he could quote any figures for series of patients so treated.

Dr. Blackburn, in reply, said that in his unit the Fantus test was never carried out, and therefore he could not answer Dr. Finch's question about the technique. He had not seen the test performed in six years. In reply to Dr. Finch's second question, Dr. Blackburn said that any test carried out in relation to a patient's fluid and electrolyte balance should be the direct responsibility of the patient's medical attendant. Recently at the Royal Prince Alfred Hospital instructions had been issued to the effect that resident medical officers should change the bottles when



necessary in the treatment of any patient receiving intravenous therapy; it should not be left to the nurses to do. Dr. Blackburn considered that intravenous therapy was very important, and one was never sure of the rates of administration of the solutions used unless one was responsible oneself. Referring to the reliability of the Fantus test, Dr. Blackburn said that it was quite reliable if one interpreted it properly. The test indicated how much chloride was in the patient's urine; it might or might not tell what the blood level was. If one knew the patient's history, the test might give a fair indication of the blood chloride level. If the result of the test was significantly positive, it showed that the patient was receiving more chloride than he required, because he was excreting it. In reply to Dr. Finch's question about electrocardiographic tracings, Dr. Blackburn gave several reasons why they were recommended rather than serum potassium estimations. In the first place, one could get the report by looking at the tracing while it was being taken, whereas one often had to wait until the next day for the result of a serum potassium estimation. Dr. Blackburn said that he did not worry very much about serum potassium estimations, because it was impossible in many circumstances to be sure that the blood had been properly collected. As an isolated reading the electrocardiogram was unreliable; but if repeated tracings were taken, it was a reliable test and anyone could become familiar with it. The important thing to do was to take a control tracing when it was anticipated that the patient might develop a disorder of fluids and electrolytes—not when they developed such a disorder. In reply to Dr. Finch's question about the treatment of burns by the administration of plasma, Dr. Blackburn said that he himself did not treat burns. However, he had quoted from a report by Bull, from a burns unit in Manchester, who had treated a series of 2807 patients. Bull had stated that there was a 50% mortality rate among children aged from birth to fourteen years when 50% of the body surface was burnt, which was a somewhat better result than the average doctor could claim. From fourteen years to fifty-four years, there was a mortality rate of 50% when 46% of the body surface was burnt. Over the age of sixty-five years, half the patients recovered who had 10% of the body surface burnt. Bull had set out the following recommendations for the treatment of patients with burns: half the plasma requirements should be given in the first eight hours, and the other half in the next sixteen to twenty-four hours; the mortality rate depended upon the number of hours between the receipt of the burns and the administration of plasma. Bull gave very large amounts—one litre of plasma for each 10% of body area burnt. In the treatment of children he gave their plasma volume for each 15% of body area burnt; if 45% of the body area was burnt, they received three times their plasma volume, half in the first eight hours. That was more than most people gave, and Bull's argument was very good, first from the point of view of his results, and secondly, because in burnt patients plasma leaked into the burnt area, and it could not be replaced by anything but plasma. Water or saline simply went out. Dr. Blackburn thought Bull's form of treatment quite rational.

Dr. JOHN PRIESTLEY referred to the possibility of overhydration of the newborn baby. He mentioned a baby born recently with severe neonatal anaemia; the haemoglobin value was 70%. A transfusion of 110 cubic centimetres of blood was given over an hour, and the haemoglobin value rose to 135%. Dr. Priestley wondered what the risks were. He thought that Dr. Blackburn would have calculated the required amount as 80 cubic centimetres.

Dr. Blackburn said that he had had no experience of such a problem, and that he would have done precisely as Dr. Priestley had done. Professor Lorimer Dods would have recommended 80 cubic centimetres.

Dr. J. L. WATT said that the Tamworth Base Hospital was fortunate, in that many laboratory tests were available. The greatest problem in a base hospital was that it received patients from great distances—babies with pyloric stenosis or gastro-enteritis, or old people with intestinal obstruction; the temperature might be 110° F. in the shade, the patients might travel 100 miles, and no attempt might have been made to provide fluid or electrolytes for them. The gospel of fluid and electrolyte replacement should be preached widely. Country practice was different from town practice, and had to be carried on by rule of thumb. Everything that could be done to make the subject simpler should be done. Dr. Watt had one question to ask. He thought that Dr. Blackburn did not agree with the rule that the patient who had lost intestinal fluid from vomiting had alkalosis, and the patient who lost intestinal fluid from the bowel had acidosis, and asked Dr. Blackburn to comment.

Dr. Blackburn, in reply, said that he thought that a patient who lost fluid through a tube down beyond the stomach usually had acidosis. If he was vomiting, and had acid vomitus, alkalosis developed. Dr. Blackburn was not happy about the rule that Dr. Watt had quoted. His whole attitude towards fluid therapy was summed up by saying that it was necessary to consider the particular patient and to use what information one could get. If one could get no information, then it must be remembered that if the disease process had been going on for some time there was usually acidosis because of the operation of various factors—starvation and ketosis, poor renal function and retention of organic acids. Patients finally became acidotic unless they continued to lose much acid gastric secretion. Dr. Blackburn said that he had on occasions treated patients with chronic nephritis by giving them ammonium chloride, because they had been given much alkali to control their vomiting. As soon as the alkalosis was corrected, their condition settled down to characteristic renal acidosis. Dr. Blackburn said that in the treatment of small infants he was partial to giving them fluids subcutaneously.

Dr. Nelson, from the chair, said that one or two comments occurred to him. The first was that babies and young children presented special problems; in particular the point that Dr. Blackburn had made about the danger of overloading a patient with salt was very important in the treatment of babies, especially young babies. Dr. Nelson said that a certain amount of arithmetic was involved, and a proper fluid balance chart had to be kept. That was one of the biggest difficulties in the whole problem. At the Royal Alexandra Hospital for Children they had been at considerable pains to draw up a balance sheet for resident medical officers. It was very difficult to make it fool-proof, because everyone handling the problem had to be made aware of what he was doing. That led to the problem of hospital administration. Very few surgical patients required intravenous therapy and a fluid balance record; but when they did, they needed much concentrated study. Dr. Nelson thought that the experience at the Tamworth Base Hospital would be much the same as at other hospitals. What usually happened was that one or two people became interested in the subject, and they were the people who really knew. At his own hospital that was what had had to happen; they had set up committees to draw up instructions about the various conditions for the training of the resident medical and nursing staff. That meant a great deal of work for a few people. During the study they had been struck by one factor—there were other methods of giving fluid besides the intravenous method. The use of the intravenous route in the treatment of babies constituted a difficult problem. A very important method was the intragastric drip administration, which was not used as much as it should be. Babies who could not retain fluid given by ordinary methods of feeding could retain it when it was given by that method. Anyone who had a Ryle's tube and a dripper could feed a baby or young child by putting it into the alimentary tract. Dr. Nelson went on to say that the problems relating to surgical conditions were not nearly so important as those relating to burns. Dr. Finch had asked about the giving of blood. As Dr. Blackburn had pointed out, the replacement of serum had to be made immediately. But in cases of severe burns, severe anaemia followed, and some workers had attempted to anticipate that by giving blood. However, if blood was given in the early stages, it was difficult to assess the real haemoglobin value.

#### Present-Day Technique in Anaesthesia.

Dr. R. B. SPEIRS read a paper entitled "Present-Day Technique in Anaesthesia" (see page 413).

Dr. A. C. HOWLE said that he felt a complete nervous wreck after realizing the "near death" experiences of some of his patients. He had several questions to ask. The first referred to the use of "Eulassin". Dr. Speirs had said that a dose of five to seven milligrammes seemed a safe limit; but what happened in prolonged operations? When one had given 15 milligrammes, and the surgeon still had two hours' work to do requiring considerable relaxation, what did one do? The second question concerned anaesthesia in children. Dr. Howle asked what was the age limit to which one could use "Pentothal". If one had an anaesthetic machine at hand, was it safe to use "Pentothal" for short procedures? Dr. Howle then referred to the use of "Scoline" in dentistry. He said that it saved the dentists much time; but after having heard what Dr. Speirs had said, he felt that the dentists would once more have to wait a long time while he used something else. On the other hand, he wondered whether it would be better to use "Eulassin" again. Finally,

Dr. Howle asked Dr. Speirs to say something about premedication for children. He said that he had used most drugs, for example, "Nembutal"; its success seemed to depend on the sister in charge of the children's ward.

Dr. Speirs, in reply to Dr. Howle's first question about "Eulissin", said that when the time had expired and the anaesthetist had used his allowance, he could do one of two things. By far the more satisfactory was to convert the administration into an ether anaesthetic. Probably a machine would be at hand, and a nitrous oxide-ether type of follow-on would get him out of most of the difficulty. Dr. Speirs said that he had employed a mixture of agents under certain special circumstances. It was considerably easier to intubate the larynx with "Eulissin" than it was with curare. With such a procedure as thoracotomy, many people had used one ampoule of decamethonium; with that they had inserted the tube and got the preliminary anaesthesia over. For the rest of the time, which they knew would be considerable, they had employed "Tubarine". Dr. Speirs reminded those present that during his paper he had said that the results would be unpredictable. However, in the type of procedure under discussion the patient would be a long time on the operating table with his respiration under "control", anyway; at the time when the anaesthetist wanted to finish he would be able to forget the other agent and consider the "Tubarine" only. There was no particular contraindication to the use of "Pentothal" for children, but there were a few points about it that required notice. Any kind of trouble with children was much worse than trouble with adults; they went to pieces very quickly. For "Pentothal" anaesthesia a suitable vein was required; where there would be a cannula tied in, of course there would be difficulty, but usually venepuncture was fairly easy. The anaesthetist ought to have the child's consent; it was foolish to subject a child to an injection instead of a mask on the face unless the child agreed that it would be better. Dr. Speirs said that he consulted the child, and said what he himself would prefer. Usually children aged up to five years preferred "scout"; children of six or seven years would agree to have the "needle", and having agreed, would keep their arm still. Dr. Speirs went on to say that anaesthesia in dentistry presented a considerable problem. Dr. Speirs took it that if a medical practitioner was using any relaxing agent in a dental surgery, he had a machine and the capacity to deal with any emergency. If that was not so, he should not use any relaxant. If he was equipped to use a relaxant, "Scoline" was as good as any. Referring to premedication of children, Dr. Speirs said that it was difficult. Their basal metabolic rate was very high, and they got through large quantities of drugs. He thought that 1.5 grains of "Nembutal" could be given at the age of five years, and other doses accordingly. It was less reliable than "Seconal", which produced a short, intense action. An adequate dose was 1.5 grains at the age of five years. If it was desirable really to "get" the child, there was little to touch "Avertin"; but it had to be worth while. Children could be given morphine and atropine or "Omnopon" and scopolamine in doses proper to their weight. Dr. Speirs said that he gave a preparatory dose of "Seconal" two hours before the operation and atropine one hour before operation; at that stage the child was sufficiently under "Seconal" not to care. Even if the operation took less than half an hour, the effect of the "Seconal" would still tend to have worn off near enough to the child's return to bed.

Dr. K. X. CROSS asked whether the intravenous injection of nikethamide was an antidote to apnoea produced by "Scoline".

Dr. Speirs said that if the apnoea was really due to "Scoline", then the answer was "no". The best "antidote" was a transfusion of blood. In general nikethamide was a potent respiratory stimulant and would bring back a patient's respiration when it was lagging. It had been suggested that the application of such a drug was equivalent to producing respiration with a whip. Most anaesthetists would not employ it; they would go on "pumping" the patient until the respiration improved. It was doubtful whether nikethamide was a suitable drug to use; it stimulated respiration by an undesirable method.

Dr. A. J. LUNDIN asked about premedication for smaller children, aged about two years.

Dr. Speirs said that it was probably unusual to offer premedication to children of such an age. The child had to be induced to swallow the drug, and that was rather difficult. Chloral, in a dose of one grain per year of age, used to be advocated. Dr. Speirs thought that the best effect might be obtained by the rectal administration of "Pentothal"; by that method one made sure that the child received the drug. Scopolamine, morphine and atropine were quite

satisfactory if the dosage was judged according to the child's weight.

Dr. N. B. HYAMS asked Dr. Speirs to comment on the phenomenon of belated curarization, in which the patient, reported to be breathing correctly after the use of a relaxant, was moved from the operating theatre back to bed, and later was suddenly found to have stopped breathing. Dr. Hyams wondered whether that was what Dr. Speirs was referring to when he mentioned the effect of turning the patient on the operating table, moving him onto the trolley *et cetera*. Had Dr. Speirs seen it occur?

Dr. Speirs said that respiration was very susceptible to peripheral stimuli. Barcroft had done some work on the fetal sheep. He had found that the fact of the lamb's being born onto the snout was a great stimulus to its first breath. Such a stimulus was applied to the newborn baby that did not breathe by the nurse who slapped it on the bottom. That was a peripheral stimulus. Some people held that it was the physical effect of the stream of oxygen on the baby's face that made him start to breathe. The patient's respiration might be stimulated by stitching up of the skin. It was only when he was left comfortable and warm that he would go back into a state of curarization. Dr. Speirs said that he had seen too much of it. It was recognized fairly easily. The patient began to make ineffectual flapping movements like a fish out of water. Medical practitioners would see many instances of the phenomenon if they employed paralyzing dosage of relaxants such as "Flaxedil" and "Tubarine" and did not use "Prostigmin", a bad practice. A few years previously, in an Australian capital city, he had seen a recovery room, with one patient in it early in the day, another patient later on in the day. He was sure that all the patients needed was not a recovery room, but a few milligrammes of "Prostigmin". In the same city they had later made that discovery, and a major use for the recovery room disappeared. Dr. Speirs then described the way in which the phenomenon developed, by an illustrative case. He said that early in the year at a large hospital a new senior resident medical officer started on such an anaesthetic. He gave 160 milligrammes of "Scoline", and at the end of the operation he decided to give "Prostigmin". He gave one ampoule by injection, and the patient responded and was returned to bed. Ten minutes later there was great excitement; the patient was a blue-black colour and was making ineffectual movements. A subsequent "court of inquiry" showed that the "Prostigmin" given was an ampoule of 0.5 milligramme, prepared for quite another purpose. What happened was that the immediate effect of the small dose of "Prostigmin" counteracted the effect of the "Flaxedil". Then it wore off, and the effect of the "Flaxedil" returned.

Dr. R. T. FINCH asked Dr. Speirs why he had discontinued the use of "Laudolissin".

Dr. Speirs said that it might be being unjustly condemned, but it seemed very difficult to reverse the action of "Laudolissin", though it was said to be reversed by "Prostigmin". In practice its effect was not so certainly reversed as that of tubocurarine and gallamine. Therefore at the end of the operation it was difficult to restore the patient's respiration.

Dr. N. B. HYAMS asked Dr. Speirs to describe the signs of the effects of a relaxant continuing while hypnosis wore off.

Dr. Speirs said that in the words of Noworthy, one never saw the phenomenon of a patient waking up in the middle of an operation except in cases of total curarization of the patient and total inattention on the part of the anaesthetist. Dr. Speirs thought that was probably fairly true. Unless the patient was grossly overdosed, some movement, particularly of the facial muscles, would be noted; the eyes or mouth would be twitching, or head movements would be seen. That would apply in any case in which relaxing agents had not been used in tremendous excess. It had been stated that an increase in the pulse rate was a sign of the phenomenon. It was hard to be sure. Dr. Speirs said that his own practice was almost never to give a relaxant without sufficient nitrous oxide to ensure that the patient would be asleep. A colleague's method was to mix the relaxant with thiopentone. With regard to the agent which he used most, Dr. Speirs said that he used all of them, according to what was required. For example, there was little point in using "Scoline" if the operation was to continue for any length of time, since its effect lasted for ninety to one hundred and twenty seconds only. It would be more sensible to use one of the longer-acting relaxants, and in the allowable dosage that was quite permissible. The use of tubocurarine was somewhat restricted in private practice in Sydney because of its high price. It was con-



sidered to be one of the best of the relaxing agents, but it cost about seven shillings per ampoule. A fair amount was used in hospital practice.

Dr. Nelson, from the chair, drew attention to the debt which all surgeons owed to the anaesthetists and to modern techniques of anaesthesia. He said that many procedures were now possible and practicable which had been impossible before the appearance of the specialist band of anaesthetists, who were prepared to devote their energies to that important subject.

#### Clinical Demonstration.

On October 31 a series of clinical demonstrations were given by members of the Northern District Medical Association.

#### Morton's Metatarsalgia due to Digital Neuroma.

Dr. HERSCHEL BEATTIE showed a married woman, aged thirty-two years, who had been suffering from Morton's metatarsalgia due to digital neuroma. She had complained of the typical pain for many years. Conservative treatment was carried out for five months, consisting of attention to footwear, exercises, metatarsal arch support, contrast baths *et cetera*. In spite of that treatment the pain was still unbearable.

The classical syndrome was present including "lancinating pain" from the heads of the third and fourth metatarsals to the third and fourth toes, tenderness between those metatarsal heads, paraesthesia between the third and fourth toes and a desire to relieve the pain by squeezing the forefoot with the hand. Dr. Beattie remarked that the condition was common in women with contracted toes. The operation performed on September 13, 1954, was simple; a large neuroma presented between the third and fourth metatarsal heads under a plantar incision.

Dr. Beattie said that it was considered that to avoid recurrence of pain after the operation the two nerves joining at the site of the neuroma should be severed well back away from the metatarsal heads in order to avoid pressure on the terminal neuromata at the severed ends of the nerves. It was necessary to follow the operation with foot and leg exercises and attention to footwear. A possible reason for that site of neuroma formation might be that the two interdigital nerves usually joined between the metatarsal heads before separating to the adjacent sides of the toes; thus the nerve was anchored under the pressure at that point.

The patient two months after the operation was free from pain and well pleased with the result.

#### Fractures of the Tibia, Fibula and Femur.

Dr. Beattie's second patient was a man who had sustained multiple fractures of the lower third of the tibia and fibula of the right leg and a subtrochanteric fracture of the left femur. Dr. Beattie said that fractures of the tibia at the site concerned were subject to delayed union, so after unsatisfactory efforts at reduction, resort was made to open reduction and internal fixation by vitallium plate and screws, supported by long-leg plaster cast. With the right leg satisfactorily immobilized, attention was then transferred to the left femur. The typical displacement of the upper fragment was easily corrected by open reduction, and apposition maintained by a Smith-Petersen nail attached to a McLaughlin plate screwed to the shaft of the femur below the fracture. The magnitude of the fractures was typical of the severity of injuries to riders of falling horses. At eight months good union was occurring, and the patient was weight-bearing.

Another patient, a man, aged forty-eight years, had been undergoing treatment for fracture of the right tibia and fibula when his crutches slipped and he sustained a peritrochanteric fracture of the femur of the same leg on July 12, 1954. It was treated with a Smith-Petersen nail and McLaughlin plate, so that further immobilization of the knee joint was not required. The point of the nail being close to the joint cartilage, it was removed on August 30, 1954. Union was progressing well, and the patient was weight-bearing at the end of four months. The question arose of the compensation covering the additional fracture occurring during treatment.

A married woman, aged sixty-seven years, with a typical adduction subcapital fracture of the neck of the femur treated with a Smith-Petersen nail was presented to illustrate the third type of fracture in this region requiring internal fixation.

#### Dislocation of the Shoulder.

Dr. Beattie then showed a man, aged twenty-two years, an active young rural worker who had been treated by Bankart's operation on June 3, 1954, for recurring dislocation of the right shoulder joint. After being immobilized for eight weeks he had been back at work in rural pursuits for two months.

The patient's brother had also sustained a dislocation of the right shoulder joint shortly after the first brother's operation. X-ray examination showed avulsion of the antero-inferior lip of the glenoid cavity. He was treated by immobilization in a sling by the side for three weeks, and so far there was no recurrence.

Dr. Beattie remarked that dislocations of the shoulder were frequently reduced and reduction was not followed by the essential three weeks' immobilization which should prevent recurrence.

Another patient suffering from recurring dislocation of the right shoulder joint was a young stoker. He had been treated on May 17, 1954, by Bankart's operation, modified by double-breasting the capsule and suturing it to the tissues about the glenoid rim, so that the difficult procedure was avoided of drilling the glenoid rim for fixation of the capsule. The stoker had been back at work without recurrence so far.

Dr. Beattie said that some authorities considered that effective results were obtained by plicating the capsule and subscapularis muscle and avoiding drilling of the glenoid rim. It was necessary to have some resulting limitation of external rotation, as demonstrated in the present case, but that did not interfere with function. In active young people the operation was of much greater magnitude, but more effective than the simpler Nicola operation, as the bicipital tendon, in the latter case, chafed through in any but sedentary occupations.

## Out of the Past.

*In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.*

#### A MEDICAL MEETING.<sup>1</sup>

[From the *Sydney Herald*, January 16, 1834.]

To the Editors of the *Sydney Herald*.  
Gentlemen,

It must be the regret of all the respectable portion of the Medical Faculty, that circumstances of a very personal and unpleasant nature have led to the anonymous advertisements, which for some weeks past have been figuring in the pages of some portion of the Colonial Press, regarding a meeting of that body to be held about the middle of the present month. Although connected with that profession, and acquainted with most of its members, at the same time approving partly of the object intended, I think it very curious that all should disclaim having any connection with the public notice. How or whence it issued, no one knows, and curiosity alone will induce any one to attend it. What a treat it must be for the Public in these dull times, to see an assemblage of their *life-preservers* and to listen to the orations of men fraught with all the learning of modern Europe! What a treat for the Australians to hear the flowing eloquence of men, grown grey in consuming the mid-night oil at the Universities of Edinburgh, London and Leyden; or the prattling of the junior member still elated with his diploma of yesterday. Woe betide the individual who has ventured to administer a salutary draught without the sanction of some Royal College or learned Senatus—this meeting will give the death blow to his further experimenting on the corpora of His Majesty's illegitimate subjects. We get the title of being a liberal profession, but this act will clearly prove us a most illiberal one. The success of Apothecaries and non-licentiates in this town has been owing to a deficiency of qualified practitioners of whom we have now a superabundance; and also to the system of surgeon-apothecaries who both prescribe and administer in their

<sup>1</sup> From the original in the Mitchell Library, Sydney.

own shops: hence the invalid experiencing this treatment in a few, naturally thinks every sign of a *Pestle and Mortar* a sufficient guarantee for the skilful exhibition of a sanitary bolus. Is the apothecary to say to the applicant I am not qualified to prescribe? Surely not. If the disease is of a simple nature he cannot err in exhibiting some simple remedy. If it is of a more aggravated or dubious nature he says to himself, I cannot do wrong in giving a dose of oil or perhaps a bread pill which, with a little patience, and the assistance of nature has wrought some miraculous cures.

If the profession is resolved to hold a meeting, let its object be that of mutual intercourse and information, both very much required in a Colony where disease is of a somewhat different nature from that of other climates and where the profession is so completely isolated from all communication with other Societies of a similar nature. By unanimity and perseverance a great deal might be done for their own and public advantage. Schools of Anatomy, Surgery, Chemistry &c. might be established, where the Senior as well as the Junior members might improve their knowledge and refresh their memories with many valuable and practical facts, which, through want of opportunity, are neglected and forgotten. In their meeting, however, let them beware of harrowing up the *faux-pas* of others as no one knows how soon their own may be exposed: and to those who are disposed to do so I would recall the story of the pavior when challenged by Dr. Radcliffe for his work being ill done and covered with earth to hide its faults, replied: "Doctor, mine is not the only bad work the earth covers."

I am, &c.,

HIRUDO.

## Correspondence.

### SIGNATURES ON MEDICAL CERTIFICATES.

SIR: In the British Medical Association (New South Wales Branch) notes of February 21 it is pointed out that all medical certificates must be signed in the full by the practitioners issuing them. This raises the question of legibility, as often a record of the name of the person issuing a certificate has to be kept. Some so-called signatures are nothing but illegible scrawls. At times a clue may be gleaned from the name printed on the letterhead, but it must not be forgotten that certificates are often signed by partners, assistants or locums.

Much time and trouble could be saved if the issuing practitioner would print his name in capital letters beneath his signature.

Yours, etc.,

A. W. J. BULTEAU.

143 Macquarie Street,  
Sydney,  
February 24, 1955.

### MEDICAL OFFICERS ON SHIPS.

SIR: As the "non-uniformed holiday-tripper" medical officer on the ship which brought Dr. Michael Dillon to Australia, may I make the following brief reply to his remarks in THE MEDICAL JOURNAL OF AUSTRALIA, February 12, 1955. The date of his letter (January 21) shows that he wrote it two days before landing in Brisbane, which explains that he is not quite aware of the situation regarding the recruiting of medical officers for the Merchant Navy in Australia. From his letter it would appear that the shipping companies are keeping these positions as special prizes as a holiday trip for Australian doctors, thus excluding from employment the regular surgeons. The truth is far from it. The pay the shipping companies offer is so unattractive that few if any Australian doctor would want to make the sea his career, as it would be impossible to make a living.

The medical agency has a hard time to provide a medical officer for the Australia-Japan run, because the holiday-tripper might have to resign a few days before sailing owing to the difficulty in finding a locum at a short notice, as sailing dates are uncertain due to strikes, weather conditions and a lot of other things. I am sure that the shipping companies would much prefer somebody for permanent employment, only they cannot get it. So the situation is not only satisfactory from the holiday-tripper point of view, but more so from the shipping companies' point of view, and not least from the passenger's point of view, who is

receiving first-class medical attention (these doctors are not amateurs from the medical point of view, whatever Dr. Dillon means by nautical point of view). There is no charge for the treatment, as surgeons on this run are not allowed to charge fees, and drugs are supplied free of charge, too.

I do not quite understand why Dr. Dillon is so keen on the surgeon wearing a uniform. The biggest lines which do insist on uniform most likely pay enough for the surgeon to have the outfit made worth while. On the round trip to Japan the whole salary would not be enough for the five different kinds of uniforms a ship's officer is supposed to have. A few days out at sea and every passenger knows who the Surgeon is—uniform or no uniform—but not one in a hundred would be able to make a difference in the uniform of, say, the First Engineer and Surgeon, or between the Third Mate or Fourth Engineer. If the company would compel a single tripper to wear uniform, I am afraid there would be even less applicants for this kind of a job than there are now.

Dr. Dillon can rest assured that Australian doctors give the best of service as ship surgeons without uniform, and they do not bring the Merchant Navy surgeon into disrepute.

Yours, etc.,

A. WEISZ.

Wallerawang,  
New South Wales,  
February 13, 1955.

### FLUORINE AND OUR DRINKING WATER.

SIR: There is a growing movement, originating in the field of protective dentistry, for the addition of the antibiotic element fluorine to our water supply. Any evidence which can contribute to assessment of possible long-range deterrent effects on human health and personality is of urgent contributory value at the moment, in view of recent proclamations.

My brief is, firstly, that de-novo researches (the subject of a Congress exhibit, 1952) allowed of the prediction that an antibiotic element, strontium, could isomerically replace calcium in bone, a prediction arrived at ten years before tracer radioisotope experiments confirmed this forecast.

Secondly, the danger, as later discussed, is that fluorine may insidiously displace other essential halogen elements on what, in its static flux-impeding effects, may in simile be termed a "wax fruit" basis.

The metabolic calcium-strontium interchangeability, operating on an isomeric basis, it will now be argued, is not a fortuitous one, and that the principle entailed is equally applicable to the halogens. In preamble, it can be stated that the periodic classification of the elements is not a merely academic one, divorced from analogous associations in Nature.

In their natural occurrence, minerals, as mined in industry, are widely found in geomorphic associations which conform to analogous contiguous associations encountered in the periodic table.

And in the present researches it has been possible to explore in terms of objective natural law the reason for this association, with an extension of its higher application biogenetically, in the equation of dependence of life on mineral absorption.

Reference in the periodic atomic table to the vertical B group of the second atomic series reveals the following sequence:

Group B.—Second atomic elements in periodic table: magnesium, calcium, strontium, barium.

Such elements occur geologically in identical associations, due to chartable geomorphic principles, which prove to have a higher application in biomorphism and growth, as such is seen to concern the naturally used element calcium and the sole artificial absorbent strontium.

The halogens which constitute the B group in the vertical series of the eighth atomic element in the periodic table are also encountered in natural deposits, in an analogous series or complex, namely: fluorine, chlorine, bromine, iodine.

In the case of the halogen group, the vast implication of chlorides in electrolytic tissue balance, and again in hemorecretory function, the intrinsic dependence of the thyroid on iodine and, finally, the participation of bromine in pituitary metabolism, involves the distinct possibility of an antibiotic partial replacement by fluorine of these elements, on a long-range isomeric basis.



When strontium was revealed as absorbable in the constructive anabolic and catabolic flux of bone, strontium salicylate was used in the United States of America to combat osteoporosis in osteoarthritis of the hip joint.

Though this remedy has a definite clinical value, it must be used only intermittently if insidious systemic and local (odematosus) side effects are to be avoided.

Though the line is hard to draw, regarding what may be termed chemical interactive effects of a poisoning nature, health-disturbing hyperfluorination occurs in areas of Mexico and Texas, with up to seven in 1,000,000 parts of water.

The University of Mexico, with the aim of defluorination of water, comments on the fragility of bones, where half the calcium may be displaced, and notes both the arrest of unerupted juvenile teeth and anti-enzyme effects in body-wide metabolism.

Stuber and Lang found that, as a whole, individuals residing in places where the fluorine content of their drinking water was high, had a coagulation time of six to twenty times that of a normal individual drinking fluorine-free water. (This no doubt is based on an interference with the calcium elements in the blood complex responsible for clotting.)

Where anti-enzyme activity is concerned, it may be said incidentally that *in vitro* heavy metals inhibit normal enzyme activity. No doubt the therapeutic effects of chrysotherapy can, in its palliative effects in arthritis, be ascribed effectively to a restraint of disintegrative dysenzyme activity—that is, a pathological derangement or disequilibrium in the disintegrative aspects of internal deteriorative disease.

Dr. Royal Lee, of the Lee Nutritional Foundation, Milwaukee, pronounces on the question of whether antibiotic minerals are absorbed in an inorganic or organically combined manner as one of considerable significance. The fact is emphasized that, in human beings and in experimental animals, a capacity exists to excrete the organic fluorine combination as such is a by-product perhaps of the humus of the soil.

Mineral fluorides are said to be absorbed and accumulated without excretion. In this principle a parallel is drawn to the noxious effects of mineral cobalt (which interferes with amino acid activity) on the one hand, and the physiological normality of organically combined cobalt, as a foundation to vitamin B<sub>12</sub>.

If we are committed to this fluorination process, I would seriously consider reversion to rain water tanks, despite loss of essential minerals, which could be compensated for by other means. As a practical solution of the problem every household should be provided with a chart of optimum positive nutrition, in order to preserve the gingiva, with a counsel to use a toothbrush from infancy after all meals taken at home.

For over a decade in the different but allied sphere of internal deteriorative disease, I have used such a brochure, coupled with a judicious identification of the simple hazards of living.

Despite that *laissez-faire* bugbear, human nature, which seeks comfort rather than logic, and which will respond to a better way of doing things though it may ignore precept, individuals are constantly encountered who still subscribe enthusiastically to such a regime many years later on a protective basis.

Yours, etc.,

111 Collins Street,  
Melbourne,  
February 16, 1955.

FRANK TRINCA.

#### THE USE OF PAS IN RHEUMATOID ARTHRITIS.

SIR: Following the report by Brous (1952) of the beneficial effect of PAS in rheumatoid arthritis, PAS was given to 10 cases of rheumatoid arthritis at the Rheumatism Clinic, Saint Vincent's Hospital.

PAS has previously been reported as useless in rheumatoid arthritis by Duthrie and Swanson (1950). However, reference to their article revealed that PAS had been given in very large doses, three grammes every three hours, to six patients. The longest period of treatment was thirty-five days, and in one case it was suspended after six days.

The routine treatment for rheumatoid arthritis at the Clinic had been: rest, gold, prophylactic sulphadiazine and some form of salicylate. At the end of 1952 "Disprin" was

being used in most cases. For these ten cases we substituted PAS for "Disprin". Initially the dosage was 0.5 gramme every four hours, increased to a maximum of one gramme every four hours. The progress of the 10 cases was so satisfactory that all cases seen since, over sixty cases to date, have been treated similarly. From the original 10 cases, eight have settled down with full and painless movement and normal blood figures. They have been back at their former work for the past year.

There is a negligible toxicity with PAS in this dosage. Occasionally it has to be suspended temporarily for nausea. Many cases have been taking it continually for two years.

Recent advances in the study of salicylates throws some light on the aetiology of rheumatoid arthritis. Trethewie (1951) demonstrated that salicylates and aspirin have an antihistamine action. Later he showed that PAS has a similar antihistamine action (1952). This offers an explanation of the beneficial effect of PAS in pulmonary tuberculosis, where the pathology is generally accepted to be an allergic reaction of sensitized lung tissues to the toxin of *Mycobacterium tuberculosis*. A similar action can be visualized for the salicylates in rheumatoid arthritis. For the sensitized endothelium of the lung arterioles substitute the sensitized endothelium of the articular arterioles; for tuberculin substitute the toxins of a wider, non-specific group of pathogens, including *Streptococcus haemolyticus*.

There is a great deal of other evidence for the thesis that rheumatoid arthritis is an allergic arteritis, but it is unsuitable for elaboration in a letter. But I will mention the marked antihistamine effect of ACTH and cortisone, which are as effective in rheumatoid arthritis as in asthma and other allergic states.

However, in practice I have found the combination of PAS, gold, "sulpha" and rest effective in the treatment of rheumatoid arthritis.

Yours, etc.,

BRIAN G. HAYNES.

185 Macquarie Street,  
Sydney,  
February 20, 1955.

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#### YOUNG DOCTORS AND SPECIALIZATION.

SIR: I seek your indulgence in asking permission to write again on "Young Doctors and Specialization". I am afraid that I do not agree with my colleague, Dr. Lane, who is at one with George Bernard Shaw in his argument that "all progress depends on unreasonable means". The history of medicine proves the reverse to be the case.

Again I do not agree that the countless trivialities of everyday sickness should not be matters that call for the attention of all members of the profession. Who can tell when what appears to be a triviality may prove to be a serious malady?

Dr. Sussman says: "Who is to say that our own senior consultants . . . are inferior to their contemporaries who have a long background of general practice?" But who is to say that men like Sir Alexander McCormick, Sir Herbert Maitland and hosts of others who proceeded to eminence by way of general practice were inferior to our consultants of today?

I have had personal experience of the British system of training, have talked with many Americans who were here during the second World War, and have a fair knowledge of the conditions under which surgery is practised in Australia in general, and in Queensland in particular. The British system of training puts emphasis on academic training and leaves most of the practical training to the individual. If the individual cannot secure a hospital appointment it may be years before he is able to do the work he wishes to do. In the United States of America the system is to select young men after graduation and arrange

for them to a series of rotating registrarships in surgery, under a master surgeon, for several years, as a preliminary to qualifying for the American College of Surgeons. If they are unfitted for this work they can return to general practice.

We in Australia need surgeon-specialists and those who can do the surgery of general practice. Probably as much, if not more, surgery is done by general practitioners than by those who specialize. If the system of training young graduates recently told in *THE MEDICAL JOURNAL OF AUSTRALIA*, as practised under the direction of Dr. McCaffrey, of the Newcastle Hospital, is followed, there would be less talk of the uselessness of training in general practice, as part of the training for a surgeon.

There is also very great need for an alteration of the *Medical Act* to prevent young general practitioners from attempting surgical work far beyond their capacity.

The medical profession in Australia has a great opportunity to improve the standard of practice of surgery here, and to ensure that young men who are willing to spend the time in becoming proficient in surgery should receive paid appointments whereby they may practise their art.

Yours, etc.,

E. S. MEYERS.

University of Queensland Medical School,  
Brisbane,  
February 21, 1955.

SIR: Kindly allow me to thank Dr. Ewen Sussman and Dr. Daniel Lane for their remarks about this subject and for their healthy criticism of my views. I would like to add several final comments about this controversial topic if I may and reply to several points in my colleagues' letters.

Firstly I should like to say that because I cast a stone at the English hospital system I do not reflect on the ability or standard of the doctors in these hospitals. It is not the standard of medical practice I am criticizing, but a hospital system which I believe has caused considerable dissatisfaction to various sections of the profession. This hospital system is largely based with great emphasis on specialization.

I still feel, in spite of various arguments put forth by the above writers, that five years in general practice after graduation would not hinder would-be specialists from fulfilling their ambitions and still be young enough to undertake the several years' training overseas. After all, assuming the average graduate gains his M.B. about twenty-four years of age, after five years in general practice and a year in hospital he would be thirty, and several years overseas would allow him to be set in his chosen specialty by thirty-five, which is still comparatively young considering the type of skilled work he has to perform.

Dr. Lane bases the technicalities of a specialty on loose foundations, if life is going to be so short that one cannot afford some five years in general practice as an all-round solid basis on which to develop later judgements.

Today certainly is an "age of rapid progress, intense competition and time is precious", but surely we still can have time for experience in general principles before we study the special case. This is still in keeping with the spirit of the age.

Yours, etc.,

Ballina,  
New South Wales,  
February 19, 1955.

OWEN H. GREEN.

#### TAXATION AND THE MEDICAL PROFESSION.

SIR: Would it be possible for the Federal Council to try to persuade the Federal Government to ease the penal load of taxation on the profession? I am about sixty-six and have not much earning life ahead of me. Most of my savings were swallowed up in taxation, and I now have little chance of increasing my meagre provision for old age. I used to employ four assistants, but after 1947, when taxation took from me my bank balance and £2000 more from the sale of two of my insurance policies, when I had to pay that most wicked and immoral of all taxes in human history, "pay-roll tax", by which an employer was made to pay the income tax morally payable by his employees, I have never been able to make up for this sanctified robbery, because the inflation and consequent cost-of-living increases beat

you every time. Now I, the brains of the business, am worse off economically than my chief assistant, a good technician but otherwise unqualified.

I took no further pleasure in my work, and to avoid this vicious tax I reduced my staff to two and just took enough work to keep myself and family at a lowered standard of living, and I now work far below my real capacity since I refuse to work for bureaucrats who recently handed themselves a gorgeous salary increase and who spend their declining years on a handsome superannuation. To provide for taxation, I must exercise the most rigid economy and deny myself the pleasures of new literature, the theatre, art and music. The creative minds I helped to support are that much worse off while the taxation slouts wallow in new-found wealth. If more work leaves me no better off, why work?

I think taxation rates should be reduced for persons over sixty-five in recognition of their work, just as pensions are granted, and to allow them their few remaining years to save, so as honorably to support themselves after their work is done.

Present taxation of doctors is iniquitous.

February 17, 1955.

Yours, etc.,

M.B.

#### THE AUSTRALIAN RHEUMATISM COUNCIL.

SIR: Can anyone tell me what has happened to the Australian Rheumatism Council, whose formation was announced in your editorial columns a few years ago? Today I received the following letter from Dr. R. T. Smith, of Philadelphia, the Secretary of the International League Against Rheumatism:

Several letters have been written during the past year and a half requesting a list of the officers and members with addresses of the Australian Rheumatism Council for inclusion in the new issue of the Yearbook of the International League Against Rheumatism. Would you be so kind as to contact whoever is responsible for such information and ask him to forward it to me with all haste, as the book is now in press. Because of the time required for setting the type of officers and members of rheumatism groups in 32 countries, we have the possibility of getting a new list for Australia included at this late date. . . . If there are any other Australian groups dealing with rheumatism, we would be very pleased to have them as well.

Your assistance will be greatly appreciated.

Like Dr. Smith, I also have striven in vain to elicit replies from the Australian Rheumatism Council, and so have officials of the Empire Rheumatism Council (London). If its silence means that it is no longer functioning, I believe that it was doomed to failure from the start. Instead of a centralized hierarchy on the lines of the Empire Rheumatism Council, our great distances require a looser form of organization, like the American Rheumatism Association.

In America, local rheumatism associations have been encouraged to develop in the large cities, to include any doctors interested in rheumatism—general practitioners, orthopaedists, pathologists and so on. And from these branches the officials of the federal association are chosen. I sincerely hope that the Australian Rheumatism Council will make another start along these lines.

Yours, etc.,

34 Queens Road,  
Melbourne, S.C.2.  
February 22, 1955.

M. KELLY.

#### Obituary.

##### PERCIVAL SYDNEY HUNT.

We are indebted to Dr. R. L. Stephen for the following appreciation of the late Dr. Percival Sydney Hunt.

Dr. P. S. Hunt died at his home at Ashfield on December 31, 1954, at the age of fifty-four years. Born on October 26, 1900, Percival Sydney Hunt was educated at Newington College, Sydney, and at the University of Sydney, graduating M.B., Ch.M. in 1923. He was appointed resident medical officer at the Royal South Sydney Hospital and was later



medical superintendent of that institution. His heart was always in hospital work rather than in private work, and after some years in private practice he returned to the Royal South Sydney Hospital, where he worked until a month before his death.

Rather reserved in disposition, Percy Hunt did not make friends easily. Those of us who really knew him always found him a sincere and loyal friend, and one who had a deep sense of duty. His loss will be felt, not only by us, but by the hospital which he served so long and to the limits of his capacity, even when suffering from a bronchogenic carcinoma which, on thoracotomy, was found to be inoperable.

#### FRANK VICTOR GORDON SCHOLES.

We are indebted to Dr. H. McLorinan for the following appreciation of the late Dr. Frank Victor Gordon Scholes.

Frank Scholes died in Melbourne on September 11, 1954, at the age of sixty-nine years. Thirty-eight years of his life from 1910 to 1948 were spent as medical superintendent of the Fairfield Infectious Diseases Hospital, Melbourne. As an authority on infectious diseases he became one of the select band of Australian physicians who have achieved international repute. Very early in his career and in the face of strong professional opposition he first used massive doses of diphtheria antitoxin serum in the treatment of severe diphtheria. The successful countering of charges that deaths from heart failure in the second week of the

In 1920 he published his first book on the subject of infectious diseases, and at this time he began to receive international recognition. He later published a second edition of his book and in 1939 completed one especially written for the instruction of nurses. As a teacher of students he was an acknowledged master, and his notes have been preserved for many years by numbers of his students.

In 1937, when the first great poliomyelitis epidemic attacked Melbourne, he was appointed to the Poliomyelitis Consultative Council. His wise and calm judgement and dogmatic decisions played a prominent part in the successful management of this epidemic.

Frank Scholes was born in the small country town of Barnawartha, near Wodonga. He was educated at Grenville College, Ballarat, and from there was successful in gaining a scholarship to Queen's College, University of Melbourne. He was a man of small physique but with strong facial features and a most impressive head. Learning came easily to him. He was possessed of almost a photographic memory, and his cultural versatility was amazing. He had the gift of logical but often destructive argument, so much so that if circumstances had been different he would have made a first class advocate at the bar. His writings had the great gift of clarity and simplicity. The first draft of an article written in his characteristically legible handwriting required very little alteration to be ready for the printer. He was an artist of no mean merit, and specialized in small coloured sketches of considerable artistic neatness. He was passionately fond of good music and was the owner of one of the earliest gramophone collections of classical and operatic music. He was a voracious reader and loved his books. His library included everything from the higher classics to even western thrillers.

Yet with all these cultural gifts one of his greatest disappointments was the fact that he was not good at games. By assiduous practice while in college he excelled at billiards, but in other ball games and in sports generally he was rather below average. While still a young man ill health cut short further ambitions in this direction, but almost to the end he was intensely interested in cricket and football and could argue with the experts on the finer points of most games. He did not make friends easily, but greatly enjoyed the company of those who were lucky enough to be numbered as close friends. In the early days of his married life he and his wife, formerly Miss Nancye Millar, entertained frequently at their beautiful home in Fordholm Road, Hawthorn. Their two sons have brought credit to their parents, one as a successful aeronautical research engineer and the other, who gained the D.F.C., as a bomber pilot.

In 1938 Frank Scholes was honoured by being created a Commander of the Order of St. Michael and St. George. His health from 1930 onwards gave frequent cause for anxiety, and after the second World War he often expressed his desire to retire. This he did in 1948, at the age of sixty-three years, after thirty-eight years of devoted service to Fairfield Hospital. He spent the last years of his retirement with his boyhood friend, Mr. G. R. Nicholas, at the latter's mansion home in Toorak. The beautiful "Scholes" Block at Fairfield, the planning of which was one of his hobbies, is a lasting and fitting monument to his services to Fairfield Hospital.

#### WALLIS MERVYN ALFRED FLETCHER.

We are indebted to Dr. A. M. McIntosh for the following appreciation of the late Wallis Mervyn Alfred Fletcher.

Dr. Wallis Mervyn Alfred Fletcher, who died at Haberfield, New South Wales, in November, 1954, was born in November, 1887, at Forbes, New South Wales, where his father was an inspector of schools. When the boy was five weeks old his father died of a ruptured appendix and the nurture and admonition of the infant became the absorbing duty of his devoted mother. There was a strong Methodist tradition in the Fletcher family which supplied a number of distinguished citizens to New South Wales, and Mervyn was very proud of the fact that his grandfather had been a missionary in Fiji—the call of the mission field had, in fact, attracted many of his forebears. He had some early schooling in Dubbo, and in 1899 enrolled as a boarder at Newington College, where his uncle, John Horner Fletcher, had previously been headmaster. In 1905 he matriculated and entered the Medical School of the University of Sydney where in 1911 he graduated as bachelor of medicine. After a year as resident medical officer at Balmain District Hos-



By courtesy of the Melbourne Argus.

disease were due to a delayed action of toxins and not to antitoxin was one of many examples of courage which was a notable characteristic of his strong personality. Later, while still a young graduate, he received the degree of doctor of medicine for a thesis of outstanding originality on laryngeal diphtheria. Prior to the first World War he visited England, where he and his life-long friend Harry Featonby gained the diploma of public health of Cambridge.

During the first World War he carried on the work of Fairfield Hospital, often single-handed, and it was during the later years of the war that he first developed signs of the vascular disease which was to cause him so much trouble throughout the remainder of his life.

pital and a similar period at Prince Henry Hospital, he acted for several months as a *locum tenens* at Leeton, but was released in time to enlist in the Australian Imperial Force in November, 1914. As an undergraduate he had been for three years a member of the Sydney University Scouts and was particularly interested in rifle shooting. His first posting was to the Second Australian General Hospital, but he had prolonged experience in the field with the Fourth and Twelfth Field Ambulances, later as regimental medical officer to the 14th Battalion. In 1915 he contracted paratyphoid fever for which he was treated in Malta. He gained his majority in 1916 and later he was mentioned in dispatches.

When his army appointment was terminated early in 1919, Mervyn Fletcher commenced the general practice in Haberfield, which he continued for the remainder of his life. From small beginnings it increased to an extent which many, less conscientious, would have considered beyond their capacity. His success was largely due to the fact that he was always more interested in his patients than in their ailments and was regarded as something much more than a medical attendant.

For many years he was on the staff of the Western Suburbs Hospital, and after a long period as visiting medical officer he was appointed consultant to the Queen Victoria Maternity Hospital. Recently he was elected a life member of the Western Suburbs Medical Association, of which he had earlier been honorary secretary. His kindly sympathetic nature was attracted by the activities of the New South Wales Medical Benevolent Association which he served as honorary treasurer from 1940 until his death. He was a Serving Brother of the Order of Saint John of Jerusalem.

All these activities allowed Fletcher little time for recreation, but he did attempt an occasional game of golf or bowls. With all these varied commitments his practice and his patients were, however, his main concern. He was particularly interested in the welfare of returned soldiers and their dependants, and his benevolence to them was not restricted to medical treatment. Throughout his life he followed high ideals with a deep spiritual background and took an active part in all the affairs of the local Presbyterian Church. He had a great capacity for loyal friendship in its truest sense, and his death was widely regretted. His wife died a few years ago. The sympathy of his colleagues is extended to his son and two daughters.

## Congress Notes.

### AUSTRALASIAN MEDICAL CONGRESS (BRITISH MEDICAL ASSOCIATION).

The following notes relate to the Australasian Medical Congress (British Medical Association), Ninth Session, which is to be held at the University of Sydney from August 20 to 27, 1955.

#### Scientific Papers.

Offers of papers will be received by the honorary secretaries of sections until March 31, 1955, and authors must indicate at least the title of the proposed paper, with a précis of its subject if a completed paper is not submitted.

Intending speakers will be notified not later than April 30, 1955, whether their offer of a paper has been accepted or rejected.

Three copies, in final form, of papers accepted (in addition to the author's copy), typed in double spacing on one side of the paper only, complete with illustrations, together with a note of visual aid requirements, must be in the hands of the appropriate secretary of section by June 30, 1955. One copy will be for the chairman of the meeting at which the paper is to be presented, one for the Editor of THE MEDICAL JOURNAL OF AUSTRALIA, and one for the lay Press liaison officer.

Under the rules of the Congress, no paper can be taken as read, and unless a paper is read it does not form part of the proceedings of Congress.

There shall be a time limit for speakers and readers of papers—namely, twenty minutes for the opener of a discussion (about 4000 words) whether the opening be by speech or by reading a paper, except where the opener is a president of a section, in which case the time limit shall be thirty minutes, and seven minutes for others taking part in the discussion by reading papers or otherwise.

It is particularly desired that readers of papers kindly give consideration to restricting themselves to the use of two inch by two inch (55 millimetre) lantern slides for projection purposes and refrain from using epidiascopes as far as possible.

All correspondence to Honorary Secretaries should be addressed to 135 Macquarie Street, Sydney.

### Exhibition on the History and Progress of Medicine in Australia.

The trustees of the Public Library of New South Wales have kindly consented to arrange an exhibition on the history and progress of medicine in Australia during Congress week. The exhibition will be in the Mitchell Galleries.

## College of General Practitioners.

### NEW SOUTH WALES REGIONAL FACULTY.

THE following notes are published at the request of the chairman of the New South Wales Regional Faculty of the College of General Practitioners.

The New South Wales Regional Faculty, being part of the British College of General Practitioners, is bound by the same constitution, and the by-laws adopted by the Faculty must be approved by the College Council in London.

So far in Australia the only other State to form a Regional Faculty is Queensland, but it is expected that Faculties will be formed in the other States of the Commonwealth of Australia, and in due course an Australian College of General Practitioners will be formed.

#### The Aim of the College.

The aim of the College is to maintain and, wherever possible, improve the standard and status of those in general practice. The College is being conducted entirely by general practitioners and so is the logical body to advise and assist those in general practice. Its aims are academic, not medico-political.

The College functions mainly through three committees:

1. The Committee on Undergraduate Education. The aim of this committee is to help educate the medical undergraduates in the ways of general practice, to encourage them to enter general practice (the backbone of the medical profession), and to maintain the ideals of the family physician. This policy is being carried out by lectures at the University and by members of the College taking students into their practices to show them how a general practice is conducted. Professor E. Ford, Dean of the Faculty of Medicine at the University of Sydney, has shown great interest in the College and is sympathetic towards our aims.

2. The Committee on Post-Graduate Education. The work of this committee is carried out in two stages: (a) The recent graduate is encouraged to join the College as an associate member and to attend lectures and the demonstration by general practitioners of patients seen and treated by general practitioners. He is given advice on the types of practices available, and, if desired, he will be found a position as an assistant with a reliable practitioner and given a sound training in general practice. He will be advised regarding types of equipment and records required and how to conduct a general practice. (b) In the second stage the committee has the following aims: (i) To provide post-graduate courses for general practitioners in Sydney and country centres. This will be done partly by the College itself and partly by existing organizations, such as the Post-Graduate Committee in Medicine in the University of Sydney and the local Medical Associations of the British Medical Association. (ii) To provide residential facilities in approved hospitals for post-graduate study. At present the Royal Newcastle Hospital and Mater Misericordiae Hospital, North Sydney, have agreed to allow members to attend for this purpose. (iii) To arrange clinical meetings and lectures with emphasis on general practice.

3. The Committee on General Practitioner Research. To encourage members to take an interest in clinical research, the College will provide facilities for those interested in research either as individuals or as members of a group interested in the same disease. The general practitioner is the one who sees the patient in the early stages of an illness and who can evaluate the various forms of treat-



ment. He can, by early diagnosis, alert the health authorities to the first indications of various epidemics.

#### Office-Bearers of the New South Wales Regional Faculty.

The following are the office-bearers of the New South Wales Regional Faculty: *Provost*, K. C. T. Rawle; *Chairman*, W. A. Conolly; *Vice-Chairman*, T. E. Y. Holcomb; *Honorary Secretary*, H. M. Saxby; *Assistant Honorary Secretary*, T. R. Street; *Honorary Treasurer*, C. R. Geeves; *Undergraduate Committee*, T. E. Y. Holcomb (Chairman), C. Laidlaw (Honorary Secretary); *Post-Graduate Committee*, C. Warburton (Chairman), W. Morris (Honorary Secretary); *Research Committee*, G. N. Aitkens (Chairman), J. G. Radford (Honorary Secretary); *Censorship Committee*, G. Duncan (Chairman), G. Howe and D. Warden.

#### Criteria for Associateship.

A person shall be eligible for admission as an associate if he (a) (i) is a registered medical practitioner; or (ii) is a qualified medical practitioner during his period of provisional registration (any person so admitted as an associate shall cease to be an associate if he fails to obtain registration within two years of qualification); (b) gives an undertaking that he will continue approved post-graduate study if he enters and remains in active general practice, and that he will uphold and promote the aims of the College to the best of his ability.

#### Criteria for Membership.

1. A person shall be eligible to apply for admission as a member of the College if he (i) is a registered medical practitioner who has been qualified for not less than seven years; (ii) is proposed and seconded by two members of the College, these sponsors not being in partnership with each other; (iii) has been engaged in general practice either for a minimum period of five years or for a minimum period of three years as an associate of the College.

2. An applicant for membership must satisfy the Council of the College of the high standard of his work in general practice by (i) evidence submitted by the applicant himself,

on an application form, concerning his practice, experience and academic and administrative achievements; (ii) supporting evidence obtained by the Council from the applicant's sponsors, from the Board of his Faculty and, if so required, from others whom he or his sponsors have chosen to appoint.

3. An applicant must also (i) submit himself to an interview with the censors, if required; (ii) give an undertaking that he will continue approved post-graduate study while he remains in active general practice, and that he will uphold and promote the aims of the College to the best of his ability.

#### Entrance Fees and Annual Subscriptions.

As from July 1, 1954, associates shall pay no entrance fee but an annual subscription of one guinea. Any entrance fee which may have been paid by an associate joining after June 30, 1954, shall be treated as being in payment of one year's subscription.

Members shall pay an entrance fee of ten guineas (nine guineas for those who became associates before July 1, 1954), and as from July 1, 1954, an annual subscription of three guineas for their first year's membership and five guineas for subsequent years.

Members joining after March 31 in any year shall not pay an annual subscription for that year but an annual subscription of five guineas for subsequent years.

Subscriptions shall be payable in advance.

#### Applications for Membership.

Applications for membership should be addressed to the Honorary Secretary, New South Wales Regional Faculty, The College of General Practitioners, 131 Macquarie Street, Sydney.

General practitioners from other States may join the New South Wales Regional Faculty, but those residing in Queensland should join the Queensland Regional Faculty.

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED FEBRUARY 26, 1955.<sup>1</sup>

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory. <sup>2</sup>	Australian Capital Territory. <sup>3</sup>	Australia. <sup>4</sup>
Acute Rheumatism .. ..	2	4(3)	4(2)	2(1)	1	..	..	..	13
Anchovy .. ..	..	..	..	1	..	..	..	..	1
Ancylostomiasis .. ..	..	..	..	..	..	..	..	..	..
Anthrax .. ..	..	..	..	..	..	..	..	..	..
Bilharziasis .. ..	..	..	..	..	..	..	..	..	..
Brucellosis .. ..	..	..	..	..	..	..	..	..	..
Cholera .. ..	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus) .. ..	..	1(1)	..	1	..	..	..	..	2
Dengue .. ..	..	..	..	..	..	..	..	..	..
Diarrhoea (Infantile) .. ..	7(7)	14(12)	1(1)	2(2)	1	..	..	..	25
Diphtheria .. ..	2(1)	1(1)	..	..	1(1)	..	..	..	4
Dysentery (Bacillary) .. ..	..	4(4)	1(1)	..	2(2)	..	..	..	7
Encephalitis .. ..	..	1(1)	..	1(1)	..	..	..	..	2
Filariasis .. ..	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice .. ..	..	..	..	..	..	..	..	..	..
Hydatid .. ..	..	1(1)	..	..	..	..	..	..	1
Infective Hepatitis .. ..	56(16)	65(51)	..	13(5)	4(3)	..	..	..	138
Lead Poisoning .. ..	..	..	..	..	..	..	..	..	..
Leptosy .. ..	..	..	..	..	..	..	..	..	..
Leptospirosis .. ..	..	..	6	..	..	..	..	..	6
Malaria .. ..	..	..	1(1)	..	..	..	..	..	1
Meningococcal Infection .. ..	2(1)	1(1)	..	..	..	1(1)	..	..	4
Ophthalmia .. ..	..	..	..	..	1	..	..	..	1
Ornithosis .. ..	..	..	..	..	..	..	..	..	..
Paratyphoid .. ..	..	..	..	..	..	..	..	..	..
Plague .. ..	..	..	..	..	..	..	..	..	..
Polymyositis .. ..	..	..	..	..	..	..	..	..	..
Puerperal Fever .. ..	6(3)	8(5)	7(1)	4	..	..	..	..	25
Rubella .. ..	..	23(7)	..	4	12(9)	..	..	..	39
Salmonella Infection .. ..	..	..	..	..	4(2)	..	..	..	4
Scarlet Fever .. ..	2(1)	13(10)	2(2)	..	2(1)	..	..	..	19
Smallpox .. ..	..	..	..	..	..	..	..	..	..
Tetanus .. ..	..	..	..	..	..	..	..	..	..
Trachoma .. ..	..	..	..	..	5(5)	..	..	..	5
Trichinosis .. ..	..	..	..	..	..	..	..	..	..
Tuberculosis .. ..	71(50)	23(15)	23(12)	3(2)	6(6)	9(4)	..	..	136
Typhoid Fever .. ..	..	..	..	1(1)	..	..	..	..	2
Typhus (Flea-, Mite- and Tick-borne) .. ..	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne) .. ..	..	..	..	..	..	..	..	..	..
Yellow Fever .. ..	..	..	..	..	..	..	..	..	..

<sup>1</sup> Figures in parentheses are those for the metropolitan area.

<sup>2</sup> Figures not available.

<sup>3</sup> Figures incomplete owing to absence of returns from Northern Territory and Australian Capital Territory.

## Corrigendum.

It is regretted that owing to an oversight an advertisement which includes the premature statement "Omnopon-Scopolamine is now available under N.H.S." appears on page XX of THE MEDICAL JOURNAL OF AUSTRALIA ADVERTISER in this issue.

## Medical Research.

### THE WILLIAM GIBSON RESEARCH SCHOLARSHIP FOR MEDICAL WOMEN.

MISS MAUD MARGARET GIBSON has placed in the hands of the Royal Society of Medicine a sum of money to provide a scholarship in memory of her father, the late Mr. William Gibson, of Melbourne. The scholarship is awarded from time to time by the Society to qualified medical women who are subjects of the British Empire; and is tenable for a period of two years, but may in special circumstances be extended to a third year. The next award will be made in July, 1955, to date from October, 1955.

In choosing a scholar the Society will be guided in its choice either by research work already done by her, or by research work which she contemplates. The scholar shall be free to travel at her own will for the purpose of the research she has undertaken.

There is no competitive examination, nor need a thesis or other work for publication or otherwise be submitted. The Society has power at any time to terminate the grant if it has reason to be dissatisfied with the work or conduct of the scholar.

Applications should be accompanied by a statement of professional training, degrees or diploma, and of appointments, together with a schedule of the proposed research. Applications must be accompanied by testimonials, one as to academic or professional status, and one as to general character. Envelopes containing applications *et cetera* should be marked "William Gibson Research Scholarship" and should be addressed to Mr. R. T. Hewitt, Secretary, Royal Society of Medicine, 1 Wimpole Street, London, W.1, England, and be received not later than June 1, 1955.

The approximate value of the scholarship will be £200 per annum.

## University Intelligence.

### UNIVERSITY OF MELBOURNE.

#### Twenty-First Halford Oration.

THE University of Melbourne Extension Committee announces that the twenty-first Halford Oration will be delivered by Professor J. C. Eccles, Professor of Physiology in the Australian National University, on Monday, March 28, 1955, at 8.15 p.m., in the Anatomy Lecture Theatre, University of Melbourne (Swanston Street tram stop 10). The subject of the oration will be "Inhibition of Nerve Cells". This lecture is open to all members of the medical profession, and entry will be free and without ticket.

## Notice.

### THE DIABETIC ASSOCIATION OF AUSTRALIA.

THE annual meeting of the Diabetic Association of Australia will be held in the lecture hall on the eighth floor of Federation House, 166 Phillip Street, Sydney, on Tuesday, March 29, 1955, at 8 p.m. The business will consist of presentation of the annual report and balance sheet and election of office-bearers.

Four films of special interest to diabetics will be shown after completion of the main business of the evening. The first of these, "Urine Analysis for Diabetics", was produced by Dr. Phillip Sattin under the auspices of the British Diabetic Association and their medical advisory panel, and was financed by the makers of "Clinitest" tablets. The

second film, "Insulin", was produced by Messrs. Burroughs Wellcome and Company for showing to members of the medical profession and pharmaceutical chemists, but it contains much that will interest the users of insulin as well. The third and fourth are short films: Metro-Goldwyn-Mayer's "They Live Again" (the story of Banting and Best) and the American Diabetes Association's dramatization "The Story of Wendy Hill".

The Association advises that its new address is 107 Bathurst Street, Sydney (telephone: BM 6851). A dietitian is in attendance to advise private diabetic patients of doctors on any Friday by appointment.

A badge and identity card for diabetics may be obtained from the Association.

## Deaths.

THE following deaths have been announced:

FRANKLANDS.—Herbert William Franklands, on February 26, 1955, at Toorak, Victoria.

BLIGH.—Erasmus Bligh, on March 5, 1955, at Sydney.

## Diary for the Month.

- MARCH 19.—Western Australian Branch, B.M.A.: Annual General Meeting.
- MARCH 23.—Victorian Branch, B.M.A.: Branch Council.
- MARCH 24.—New South Wales Branch, B.M.A.: Clinical Meeting.
- MARCH 25.—Queensland Branch, B.M.A.: Council Meeting.
- MARCH 29.—New South Wales Branch, B.M.A.: Council Quarterly.

## Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

Queensland Branch (Honorary Secretary, B.M.A. House, 225 Wickham Terrace, Brisbane, B17): Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205 Saint George's Terrace, Perth): Norseman Hospital; all contract practice appointments in Western Australia. All government appointments with the exception of those of the Department of Public Health.

## Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the journal by applying to the Manager or through the usual agents and book-sellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £5 per annum within Australia and the British Commonwealth of Nations, and £6 10s. per annum within America and foreign countries, payable in advance.